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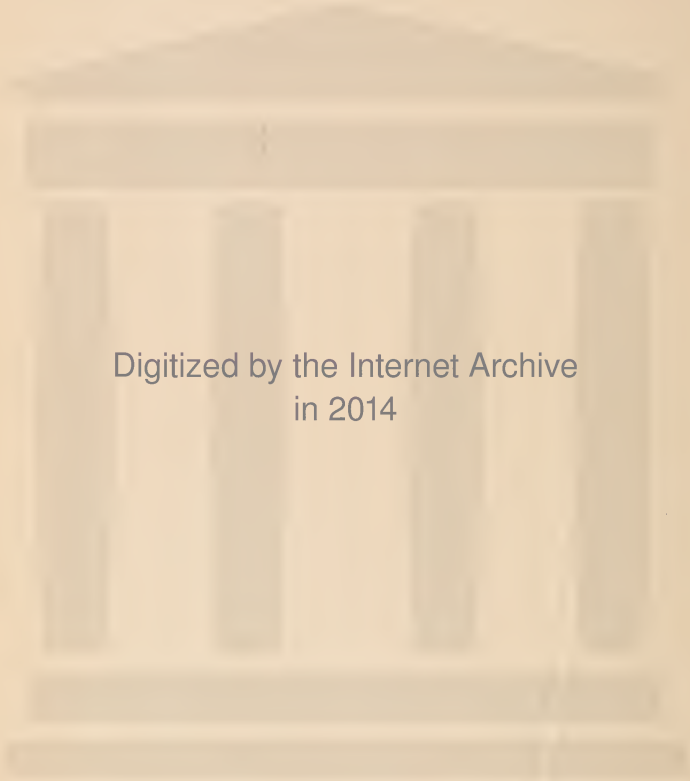

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PROCEEDINGS

OF THE

AMERICAN

PHARMACEUTICAL ASSOCIATION

AT THE

FORTY-SEVENTH ANNUAL MEETING,

HELD AT

PUT-IN-BAY, O., SEPTEMBER, 1899.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

BALTIMORE:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1899.

INITIAL MEETING AT NEW YORK 1851.
AMERICAN
PHARMACEUTICAL
ASSOCIATION
INCORPORATED AT
WASHINGTON, D.C.
FEB'Y 21.
1888.
ORGANIZED AT PHILADELPHIA-1852.

OFFICERS OF THE ASSOCIATION.

1899-1900.

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Arkansas.	Wm. L. Dewoody, Pine Bluff.
California.	Wm. M. Searby, San Francisco.
Colorado.	Chas. M. Ford, Denver.
Connecticut.	Jas. T. Eagny, New Haven.
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Dist.Columbia.	H. A. Johnston, Washington.
Florida.	Geo. W. Fisher, De Land.
Georgia.	Geo. F. Payne, Atlanta.
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Illinois.	Paul J. Behrens, Chicago.
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Iowa.	John K. Pickett, Oskaloosa.
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North Dakota.	H. L. Haussamen, Grafton.
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John H. Manning, Pittsfield, Mass.
F. W. R. Perry, Detroit, Mich.

LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	*Samuel M. Colcord*, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass.....	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.....	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.....	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York, N. Y.
Sept. 8, 1857..	Philadelphia, Pa. ...	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C...	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.....	*Samuel M. Colcord*, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y....	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	*William S. Thompson*, Baltimore.	*Theodore Metcalf*, Boston.
Aug. 27, 1862..	Philadelphia, Pa. ...	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863..	Baltimore, Md.....	*J. Faris Moore*, Baltimore.	*John M. Maisch*, Philadelphia.	*Chas. A. Tufts*, Dover, N. H.	*George W. Weyman*, Pittsburgh.
Sept. 21, 1864..	Cincinnati, O.....	William J. M Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass.....	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	*Charles A. Heinitsh*. Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.....	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York, N. Y.....	*John Milhau*, New York.	*Robert J. Brown*, Leavenworth, Kan.	*N. Hynson Jennings*, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa....	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill.....	Ezekiel H. Sargent, Chicago.	*Ferdinand W. Sennewald*, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md.....	*Richard H. Stabler*. Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	*George F. H. Markoe*, Boston.	*Matthew F. Ash*, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873..	Richmond, Va.....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky.....	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	*Augustus R. Bayley*, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.....	*George F. H. Markoe*, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa....	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877..	Toronto, Can.....	William Saunders, London, Ont.	Ewen McIntyre, New York.	*John Ingalls*, Macon, Ga.	*Emlen Painter*, San Francisco.

LIST OF OFFICERS (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga.....	*Gustavus J. Luhn*, Charleston, S. C.	*Frederick T. Whiting*, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879..	Indianapolis, Ind. ..	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y.	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington, D. C.	William Simpson, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo....	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y..	*Charles A. Heinitsh.* Lancaster, Pa.	*John Ingalls*, Macon, Ga.	Louis Dohme, Baltimore.	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883..	Washington, D. C...	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis	*John Ingalls*, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	Henry Canning, Boston, Mass.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa.....	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	*Chas. A. Tufts*, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	*M. W. Alexander*, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.....	John U. Lloyd, Cincinnati, O.	*M. W. Alexander*, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich	*M. W. Alexander*, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	*Fred. Wilcox*, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va.	*A. B. Taylor*, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.

LIST OF OFFICERS (Concluded).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891..	New Orleans, La....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill.....	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894..	Asheville, N. C.	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895..	Denver, Colo.	James M. Good, St. Louis, Mo.	Chas. E. Dohme, Baltimore, Md.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kan.
Aug. 12, 1896..	Montreal, Can	Joseph E. Morrison, Montreal, Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parisen, Perth Amboy, N. J.
Aug. 23, 1897..	Lake Minnetonka, Minn	Henry M. Whitney, Lawrence, Mass.	George C. Bartells, Camp Point, Ills.	Wm. S. Thompson, Washington, D. C.	Jacob A. Miller, Harrisburg, Pa.
Aug. 29, 1898..	Baltimore, Md	Charles E. Dohme, Baltimore, Md.	George F. Payne, Atlanta, Ga.	James H. Beal, Scio, O.	Miss Josie A. Wanous, Minneapolis, Minn.
Sept. 4, 1899..	Put-in-Bay, O	Albert B. Prescott, Ann Arbor, Mich.	Lewis C. Hopp, Cleveland, O.	Wm. L. Dewoody, Pine Bluff, Ark.	Henry R. Gray, Montreal, Can.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–1900.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
H. M. Whelpley, St. Louis, 1893.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.
John M. Maisch, Philadelphia, 1865–Sept., 1893.

PERMANENT SECRETARIES.

Henry M. Whelpley, St. Louis (acting), August, 1893.
Joseph P. Remington, Philadelphia, 1893–94.
Chas. Caspari, Jr., Baltimore, 1894–96.

GENERAL SECRETARY.

Chas. Caspari, Jr., Baltimore, 1896–1900.

LOCAL SECRETARIES.

For the meeting held in	
1867	*P. Wendover Bedford.*
1868	*Alfred B. Taylor.*
1869	*Henry W. Fuller.*
1870	*J. Faris Moore.*
1871	*William H. Crawford.*
1872	*Henry C. Gaylord.*
1873	Thomas H. Hazard.
1874	Emil Scheffer.
1875	Samuel A. D. Sheppard.
1876	Adolphus W. Miller.
1877	Henry J. Rose.
1878	*Jesse W. Rankin.*
1879	*Eli Lilly.*
1880	Charles F. Fish.
1881	William T. Ford.
1882	*Hiram E. Griffith.*
1883	Charles Becker.
1884	Henry C. Schranck.
1885	George A. Kelly.
1886	*William B. Blanding.*
1887	George W. Voss.
1888	James Vernor.
1889	Edward W. Runyon.
1890	Charles E. Dohme.
1891	A. K. Finlay.
1892	H. M. Whitney.
1893	Henry Biroth.
1894	W. G. Smith.
1895	Edm. L. Scholtz.
1896	Joseph E. Morrison.
1897	Edw. Shumpik.
1898	Henry P. Hynson.
1899	Lewis C. Hopp.
1900	T. Ashby Miller.

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91, and 1895–1900.
Chas. Rice, New York, N. Y., 1891–92.
Henry Kraemer, New York, N. Y., 1892–95.

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

	Chairman.	*Vice-Chairman.*	*Secretary.*
1880–81	Jos. P. Remington.	*Joseph Roberts.*	Geo. W. Kennedy.
1881–82	" "	Wm. J. M. Gordon.	" "
1882–83	" "	" "	" "
1883–84	" "	C. Lewis Diehl.	" "
1884–85	" "	*John A. Dadd.*	" "
1885–86	" "	C. Lewis Diehl.	" "
1886–87	Wm. S. Thompson.	*H. J. Menninger.*	" "
1887–88	Wm. H. Rogers.	Karl Simmon.	" "
1888–89	Jas. M. Good.	*Emlen Painter.*	" "
1889–90	" "	Wm. S. Thompson.	" "
1890–91	" "	" "	" "
1891–92	" "	" "	" "
1892–93	" "	H. M. Whitney.	" "
1893–94	" "	" "	" "
1894–95	Wm. S. Thompson.	" "	" "
1895–96	" "	Wm. C. Alpers.	" "
1896–97	" "	Jas. M. Good.	" "
1897–98	" "	" "	" "
1898–99	" "	" "	" "
1899–00	" "	" "	" "

PAST AND PRESENT OFFICERS OF THE SECTIONS.

Section on Commercial Interests.

	Chairman.	*Secretary.*
1887–88	A. H. Hollister.	*J. M. Colcord.*
1888–89	" "	" "
1889–90	Leo Eliel.	F. B. Kilmer.
1890–91	Henry Canning.	W. L. Dewoody.
1891–92	W. H. Torbert.	Arthur Bassett.
1892–93	" "	" "
1893–94	Wiley Rogers.	Jas. O. Burge.

Section on Commercial Interests.—*Con.*

	Chairman.	*Secretary.*
1894–95	Geo. J. Seabury.	Jas. O. Burge.
1895–96	" "	Clay W. Holmes.
1896–97	Lewis C. Hopp.	E. D'Avignon.
1897–98	Joseph Jacobs.	Jas. H. Bobbitt.
1898–99	" "	" "
1899–00	Jas. M. Good.	Chas. A. Rapelye.

Section on Scientific Papers.

	Chairman.	*Secretary.*
1887–88	T. Roberts Baker.	A. B. Lyons.
1888–89	*Emlen Painter.*	H. M. Whelpley.
1889–90	H. M. Whelpley.	C. F. Dare.
1890–91	E. L. Patch.	C. S. N. Hallberg.
1891–92	C. S. N. Hallberg.	H. W. Snow.
1892–93	C. T. P. Fennel.	F. G. Ryan.
1893–94	L. E. Sayre.	C. M. Ford.
1894–95	A. R. L. Dohme.	Geo. B. Kauffman.
1895–96	S. P. Sadtler.	W. C. Alpers.
1896–97	W. C. Alpers.	V. Coblentz.
1897–98	Edward Kremers.	A. B. Lyons.
1898–99	Henry H. Rusby.	H. V. Arny.
1899–00	Frank G. Ryan.	Caswell A. Mayo.

Section on Pharmaceutical Education.

	Chairman.	*Secretary.*
1887–88	*John F. Judge.*	H. M. Whelpley.
1888–89	*P. W. Bedford.*	L. E. Sayre.

Section on Pharmaceutical Legislation.

	Chairman.	*Secretary.*
1887–88	R. F. Bryant.	W. P. De Forest.
1888–89	C. W. Day.	J. N. Hurty.

Section on Pharmaceutical Education and Legislation.

	Chairman.	*Secretary.*
1889–90	*P. W. Bedford.*	A. B. Stevens.
1890–91	Wm. Simon.	L. C. Hogan.
1891–92	A. B. Stevens.	" "
1892–93	R. G. Eccles.	" "
1893–94	" "	" "
1894–95	Jas. M. Good.	C. S. N. Hallberg.
1895–96	C. S. N. Hallberg.	Jas. H. Beal.
1896–97	" "	" "
1897–98	Jas. H. Beal.	H. Gordon Webster.
1898–99	A. B. Lyons.	C. B. Lowe.
1899–00	C. B. Lowe.	J. A. Koch.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	Albert E. Brown, 14 N. Water St.,	Mobile.
Arizona,	Clemens L. Eschman, Washington & Centre Sts.,	Phœnix.
Arkansas,	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
California,	William T. Wenzell, 436 Oak street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
Colorado,	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
Dist. of Columbia,	Walter G. Duckett, 22d st. and Penna. ave.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
Delaware,	Herbert K. Watson, 803 Market St.,	Wilmington.
Georgia,	John P. Turner, 1002 Broad St.,	Columbus.
	Robert H. Land, 812 Broad street,	Augusta.
	Thomas A. Cheatham, Mulberry & 3d Sts.,	Macon.
	Sidney P. Watson, 137 Richardson street,	Atlanta.
Idaho,	David E. Smithson,	Emmett, Canyon Co.
Illinois,	C. S. N. Hallberg, 358 Dearborn St.,	Chicago.
	Charles Zimmermann, 423 S. Adams street,	Peoria.
Indiana,	Henry J. Schlaepfer, Second and Main streets,	Evansville.
	Frank H. Carter, 772 Massachusetts avenue,	Indianapolis.
	Jacob Baur, 701 Wabash avenue,	Terre Haute.

Indian Territory.	Chas. G. Moore,	Eufaula.
Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 568 Main street,	Dubuque.
	George H. Schafer, 713 Front street,	Fort Madison.
	Silas H. Moore, 525 Fourth street,	Sioux City.
Kansas,	George Leis, 747 Massachusetts street,	Lawrence.
Kentucky,	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
Louisiana,	Alexander K. Finlay, 186 Camp street,	New Orleans.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edward A. Hay, Free and Middle sts.,	Portland.
Maryland,	D. M. R. Culbreth, 203 E. Preston street,	Baltimore.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	John H. Manning, 51 North street,	Pittsfield.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 178 Essex street,	Salem.
	Francis M. Harris, 814 Main street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
Minnesota,	Wm. A. Frost, cor. Selby & Western aves.,	St. Paul.
	H. Gordon Webster, 15 Washington ave., W..	Minneapolis.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
Missouri,	James M. Good, 2348 Olive street,	St. Louis.
	George Eyssell, 1036 Union ave.,	Kansas City.
Nebraska,	Autumn V. Pease,	Fairbury.
New Hampshire,	Nelson S. Whitman, 175 Main street,	Nashua.
	Andrew P. Preston, 2 Congress Block,	Portsmouth.
New Jersey,	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth st. & Lafayette ave.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
	Howard P. Reynolds, 71 Washington ave., N.,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Rudolf C. Werner, 2592 Atlantic ave.,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
North Dakota,	Henry L. Haussamen,	Grafton.
Ohio,	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George L. Hechler, 1099 Broadway,	Cleveland.

Ohio.	Charles Huston, 47 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
Oregon,	Louis Blumauer, Fourth and Morrison streets,	Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburg.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
Rhode Island,	Wm. H. Cotton, 226 Thames street,	Newport.
	Wm. K. Reynolds, 354 Friendship street,	Providence.
South Carolina,	Oscar E. Thomas, 164 Main street,	Columbia.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	James O. Burge, Church and High streets,	Nashville.
Texas,	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
Utah,	Frank A. Druehl, Main and 3d South streets,	Salt Lake City.
Virginia,	T. Roberts Baker, 3101 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
Wisconsin,	Edward Kremers,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Prov. Nova Scotia,	Francis C. Simson, Pentagon Bldg.,	Halifax.
Prov. Ontario,	John A. Clark, E. King street,	Hamilton.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in Government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) and again in 1896 (Proceedings, page 17) so as to apply also to those who have been members for over twenty years (see Chapter VII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is fifty-eight, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884

(p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same Fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 125 of the present volume shows that on July 1st, 1899, the value of the Life Membership Fund was $11,609.18 (face value of securities only given), of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize*.

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; for 1891, to John U. Lloyd; for 1897 to Albert B. Prescott and Jas. W. T. Knox; for 1898 to Virgil Coblentz; and for 1899 to Henry Kraemer.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1899 (Proceedings, p. 124), its reported value was $762.20 (face value of securities only given). The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science

connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, $50 to the same investigator in 1893, and $50 again to the same investigator in 1894. In 1896 the sum of $22.33 was paid to the Committee on Indicators for material used in their investigations.

The original sum of $1107.81 ($525+$582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1504.05 (face value of securities only given) on July 1, 1899 (see Proceedings, p. 124). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28). On July 1, 1897, the above bonds were redeemed, and six (6) 4 per cent. bonds of the same company, each for $500.00, taken at par and accrued interest.

PRIZES.

The resolutions adopted August 15, 1893 (see page 16, Proc. 1893) were amended September 1, 1898 (see page 98, Proc. 1898) to read as follows:

Resolved, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of $100.00, and apportioned as follows: $50.00 for the first, $30.00 for the second, and $20.00 for the third prize.

Resolved, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

Resolved, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper.

The following resolutions were adopted September 1, 1898 (see page 98, Proc. 1898).

Resolved, That a prize be established to be known as the "Hermann Hager Memorial Prize," and of the value of $50.00. That in bestowing said prize, preference shall be given to contributions on pharmaceutical science or art, as distinguished from those on allied branches, though it shall not be confined to such. That said prize shall be awarded only when, in the opinion of the Committee on General Prizes, a contribution shall be deemed worthy of the award.

Resolved, That a prize be established to be known as the "John M. Maisch Prize," of the value of $50.00. Said prize to be awarded for research work in pharmacognosy, only on the recommendation of the Committee on General Prizes.

Resolved, That no one of the general Association prizes shall be awarded to the writer of a paper for which either the Hermann Hager Prize or the John M. Maisch Prize has been given.

For names of members of this Committee see page v.

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PREFATORY NOTICE.

At the forty-second annual meeting of the Association held at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at the General Session held September 8, 1894.

With the view of securing for the Proceedings as wide a distribution as possible, and to enable members to complete their sets at very low figures, the Council, at the forty-third annual meeting held at Denver, Colo., decided that the price of the Proceedings for 1890 and all previous years be reduced to one-half of that heretofore published. The Association at the General Session held on August 20, 1895, approved the action of Council, and the Committee on Publication offer the different issues at the following rates:

		PAPER COVER.	BOUND CLOTH.
1851, 1852, 1853, 1854, 1855	each	$ .13	$
1857	"	.20	.25
1858, 1864, 1865	"	.38	
1858, 1860, 1862, 1863, 1864, 1865	"		.50
1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873	"	.50	.75
1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883	"	1.25	1.50
1884, 1885, 1886, 1887	"	1.75	2.00
1888, 1889, 1890	"	2.50	2.75
1891, 1892, 1893	"	5.00	5.50
1894	"	6.00	6.50
1895	"	5.50	6.00
1896	"	5.00	5.50
1897	"	5.00	5.50
1898	"	5.00	5.50
1899	"	5.00	5.50

The reduced prices on all volumes published prior to 1891 do not include free delivery.

IN SETS (EXCLUSIVE OF THE POSTAGE OR EXPRESS CHARGES).

For any two or three volumes a discount of 10 per cent. on the above prices.

For any four to eight volumes a discount of 20 per cent. on the above prices.

For any nine to fifteen volumes a discount of 30 per cent. on the above prices.

For any sixteen to twenty-two volumes a discount of 40 per cent. on the above prices.

For any twenty-three to thirty-two volumes a discount of 50 per cent. on the above prices.

For any more than thirty-two volumes a discount of 60 per cent. on the above prices.

1856 and 1859 are out of print; none published in 1861.

Beginning with the first issue, in 1851, the actual cost of partial or complete sets—bound in cloth as far as on hand—will be as follows:

To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.	To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.	To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.
1855	5	$0 65	$0 52	1872	19	$9 15	$5 49	1886	33	$30 90	$12 36
1857	6	0 90	0 72	1873	20	9 90	5 94	1887	34	32 90	13 16
1858	7	1 40	1 12	1874	21	11 40	6 84	1888	35	35 65	14 26
1860	8	1 90	1 52	1875	22	12 90	7 74	1889	36	38 40	15 36
1862	9	2 40	1 68	1876	23	14 40	7 20	1890	37	41 15	16 46
1863	10	2 90	2 03	1877	24	15 90	7 95	1891	38	46 65	18 66
1864	11	3 40	2 38	1878	25	17 40	8 70	1892	39	52 15	20 86
1865	12	3 90	2 63	1879	26	18 90	9 45	1893	40	57 65	23 06
1866	13	4 65	3 26	1880	27	20 40	10 20	1894	41	64 15	25 66
1867	14	5 40	3 78	1881	28	21 90	10 95	1895	42	70 15	28 06
1868	15	6 15	4 31	1882	29	23 40	11 70	1896	43	75 65	30 26
1869	16	6 90	4 14	1883	30	24 90	12 45	1897	44	81 15	32 46
1870	17	7 65	4 59	1884	31	26 90	13 45	1898	45	86 65	34 66
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Orders for Proceedings should be sent to the General Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the General Secretary on receipt of $2.

Blank forms of applications and recommendations for membership may be obtained from the General Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, T. Ashby Miller, 519 E. Broad st., Richmond, Va.

The forty-eighth annual meeting of the Association will convene at Richmond, Va., on the first Monday (7th day) of May, 1900, at 3 o'clock p. m.

PROPOSED AMENDMENTS TO THE CONSTITUTION.

TO BE ACTED ON AT THE FORTY-EIGHTH ANNUAL MEETING, DUE NOTICE HAVING BEEN GIVEN AT THE MEETING HELD AT PUT-IN-BAY, O., SEPTEMBER, 1899.

Amend Article IV. as follows: Strike out the word "annual" in the third line, and the words "shall" and "current" in the fourth line, and insert the words "for any current year" after the word "which" in the third line, and the word "may" after the word "only" in the fourth line, so as to read "the interest of which for any current year only may be used by the Association for its expenses."

Amend Article V. as follows: At the close of the paragraph add "Any proposition to amend the Constitution for the purpose of permitting the expenditure of the permanent invested funds of the Association shall require a majority of seven-eighths for its passage.'

MINUTES

OF THE

FORTY-SEVENTH ANNUAL MEETING.

FIRST SESSION — MONDAY AFTERNOON, SEPT. 4, 1899.

THE forty-seventh annual meeting of the American Pharmaceutical Association was held at Put-in-Bay, Ohio, Sept. 4–9, 1899; the Association headquarters were at the Hotel Victory, and the various sessions were held there.

The first general session was called to order at 3:30 o'clock p. m., in the assembly hall of the hotel, President Charles E. Dohme, of Baltimore, in the chair.

The President introduced to the Association Mr. Lewis C. Hopp, of Cleveland, the Local Secretary for this Meeting.

Mr. Hopp was greeted with applause by the convention, and proceeded in turn to introduce Mayor Oldt, of the corporation of Put-in-Bay, who welcomed the Association in the following words:

Mr. President and Members of the American Pharmaceutical Association:

I thank the officers of this Association for the honor conferred upon me by placing me so prominently before this convention. I know I am addressing the members of an Association which has had its annual meetings in almost every large city in the country, from the Atlantic to the Pacific, from the Gulf coast to the great lakes; and since you have done us the honor to come to our resort of Put-in-Bay, I wish to assure you that we extend to you a most cordial welcome. I welcome you on behalf of the people of this island, on behalf of the Hotel Victory and all of the other hotels; I welcome you to the homes and hearts of the people of this island. An Association which proposes to further the cause of humanity and benefit mankind assuredly receives a cordial welcome wherever it goes.

I am informed by your secretary that this Association has for one of its objects the establishment of the purity of drugs in this country, and I recognize in such a society the benefactors of mankind. You hold in your hands more important interests than any other Association could hold, namely, the lives and happiness and the welfare of seventy-five millions of American citizens. I may, perhaps, owe the continuance of my life to the success of your efforts to secure pure and proper drugs, for, otherwise, you could bring about almost immediately the maturity of my insurance policy, if you would.

I feel, gentlemen, that in welcoming you I welcome not only chemists and the masters of pharmacy, professors of pharmacy from our best universities—all men of high degree—but I welcome a class of men who have the noblest of aims, whose lives are devoted to the cause of humanity, and who live not for themselves alone.

And now I wish to say to every member of such a convention, Welcome to Put-in-Bay island. It is yours to enjoy, and I trust you may feel at home here during your stay; and I trust also that you will be greatly benefited by your stay. And while we would like to have you return to this place next year, yet we feel honored that you have come this year; and if you decide to convene at some other resort or city in the United States next year, or to go to Cuba, Porto Rico or the Philippines, our best wishes will go with you.

Again I say to each and every member of this convention, Welcome to our entire island, and to all its enjoyments and benefits.

Mayor Oldt's remarks were heartily applauded.

Mr. Hopp then introduced Prof. John U. Lloyd, of Cincinnati, who welcomed the Association on behalf of the Ohio State Pharmaceutical Association. Prof. Lloyd was applauded as he arose to speak, and said:

Mr. President, Ladies and Gentlemen:

Allow me to say to you that the worthy president of our State Association, Mr. DeLang, was suddenly prevented from coming to this meeting by a death in his family. Had he been here you would have had an address very different from any I can give you on the spur of the moment, and I regret very much that he is not here, on your account as well as on his own. He would have considered it an honor—as I consider it—to address you here to-day.

The Mayor of Put-in-Bay has welcomed you enthusiastically, and I thank him for it. But I notice, my friends, that he has failed to tell us anything about this land that we are visiting, and so on behalf of the Ohio State Pharmaceutical Association—for I can say that we consider this a part of our land—I will venture to say a few words concerning this Put-in-Bay country, for we ought always to know something of the place we visit. Here we are on historic ground. In 1813, in September, the British and American fleets met in deadly combat somewhere in these waters near this place. Strange as it may seem, no man to-day knows just where they met. The place of the battle is lost. But this we know, that after the battle they put in to this little bay down here to bury their dead; and now where that lone willow tree stands there by the bay, within that chain that is rusted over, and within that circle of posts that stands there, without a stone, without a mark to tell who lies there, rest the remains of those heroes who fell in 1813 on that lake. This country has not attempted to mark their resting-place other than by a willow switch stuck into the ground there.

It chanced to have been my fortune to be well acquainted with the last survivor of the Perry victory, John Norris, who tramped from Kentucky with other Kentuckians to take part in that engagement—and he did take part in it. When the Centennial Exposition was held in Philadelphia they wished to have this old man there—wanted to send a special car for him; but he declined to go. I regret that I do not happen to have here with me now a picture of this interesting character. I have it in my trunk, and thought I had it with me—an enlarged picture of the last survivor of Perry's Victory, who lived on the banks of the Ohio above the little village of Petersburg, Kentucky, to the last of his days.

If you will step just to the right here, to the east of this spot, and look at the stones uncovered there where they have taken the gravel from them, you will find them creased from the northeast to the southwest in channels. Go to the neighboring islands

and you will find the same thing. These channels mark the course of a glacier that swept over this country in the dim ages of the past.

This porous limestone formation here has a national reputation, and we find that this stone is exported in ships because of its porous quality, and is used for purposes of a certain kind where no other limestone has yet been found to take its place.

We find in the caverns of this island a substance in abundance that I don't know that we have another mine of in this land. That is sulphate of strontium. And if you will visit one of these caverns down here you will find where, in the early days many years ago—I will give you this as it was given to me by an old resident—a certain German discovered it, but for reasons of his own kept his secret and covered the entrance, and for many years it so remained, and was only uncovered a few years ago.

You will find down here in this beautiful cavern called Perry's Cave they have a legend to the effect that Perry concealed there his silverware and valuables. And I would advise you not to disturb the legends of any country you visit, whether of Plymouth Rock of the East, the Golden Dog City of the North, Perry's Cave here, or the Golden Gate of the West. Take them as they are, and don't question them—at least not when you are on the ground.

Over at Sandusky, we that remember the Civil War, remember Johnson's Island, and if you will visit that island you will see the rows of stone that mark the resting place of the rebel soldiers who died there.

Just beyond we have Castalia, where a fishing club has pre-empted the finest cavern in the land. There is a cave that rivals the Mammoth Cave in extent—at least, neither of these has ever been fully explored, and so we may say it rivals the Mammoth Cave.

All about us here we have what should be fine fishing grounds. Unfortunately, however, the best fishing grounds are over the Canada line, and we have very little good fishing in American waters. Why? Because we allow seining at any and all times, whether in the spawning season or not, and the fish to be taken, little or big, and the consequence is our waters are swept dry of fish; while just over on Pelee Island, in Canada, there is abundance of fishing, because the Canadian government takes care of its fish, and allows no seining in a mile of shore in the spawning season. The trouble is, that our Congressmen who do not live near here are not concerned, and those who live near are afraid of the fishermen. I have heard it so stated.

The Ohio State Pharmaceutical Association has met two years in this hotel. We have been so pleased that we have invited you here to meet with us. We hope you will enjoy yourselves, as we did ourselves; that you will go away feeling that you have at least had good weather—pleasant weather; that you have had good food; that your rooms have been large and well taken care of, and that the hotel where you have met has done itself credit and honored the meeting.

The Ohio Pharmaceutical Association is glad to have had you meet on Ohio soil—this is the northern edge of Ohio—and we hope, my friends, that the time may come when you will meet with us again. Our friend here, Mr. Hopp, made the Ohio Pharmaceutical Association—at least he started it. I remember the circular he sent out calling the first meeting. And so he is really better qualified to speak about the Ohio Association than I am.

Gentlemen, I will not take up your time further. I am very much obliged to you for your attention.

Continued applause followed Prof. Lloyd's remarks.

THE PRESIDENT: I feel that my humble efforts to respond to those kind words of greeting from the Mayor on behalf of the good people of Put-in-Bay Island, and of our friend Prof. Lloyd, would be entirely inadequate for the occasion. I, therefore, request our fellow-member, Mr. James M. Good, of St. Louis, to respond for this Association.

Mr. Good then said:

Mr. Chairman and Gentlemen, and Members of the Association:

It occurred to me when Prof. Lloyd was speaking that his long connection with the American Pharmaceutical Association, as well as prominent connection with the Ohio State Pharmaceutical Association, would entitle him to speak for both; and it occurred to me, also when the Local Secretary was introducing him that it was probably unnecessary to introduce him to this body. While he was introducing Prof. Lloyd as from Ohio, I was reminded of a remark of Franklin when he was in Paris. Some one asked him his address when he should return to this country, and he said, "Simply address me 'Ben Franklin, America.'" And so our friend Lloyd certainly represents the American Pharmaceutical Association; and I think if any one of his friends should address him from the other side, "Prof. J. U. Lloyd, America," he would get the communication. (Applause.)

To begin at the beginning, we are certainly very much obliged to our friend, the Mayor, for the liberties of the island which he has given us. I cannot imagine a more acceptable gift than to be given full liberty to do as we please in this beautiful place. The conditions, it seems to me, are favorable for our purposes. The atmospheric conditions are such that we would not change them if we could, and other conditions are favorable for business, or for pleasure, or for romance, or for idleness, and possibly there are some here who will be inclined to employ themselves in these various ways. The words of welcome suggest a paraphrase of Commodore Perry's famous message, and I would interpret it in this way: "We have met the enemy, and we are theirs." If the Mayor will relax his vigilance a little while we are here, and simply say to his executive officers, "These are members of the American Pharmaceutical Association; let them come and go as they please, and don't call them to account," we will appreciate more fully what it means to have possession of the island.

The reference which Prof. Lloyd has made to a little historic incident which he has brought out is certainly very interesting. I very well remember a striking pictnre in our old geographies—one which I used to look for frequently as a boy—Commodore Perry's victory on Lake Erie. But, of course, I never realized that I would be anywhere near the spot. But we are on historic ground, as Prof. Lloyd says. We are not on the waters. The waters were very much disturbed at that time, but fortunately became placid very soon afterwards. The allusion reminded me of the answer of the Irishman, who, being interrogated as to his occupation, said that it was his business to haul water from the river up to the village. His questioner said, "Well, Pat, how many loads of water did you haul in a day?" "Tin, yer honor." "Yes; and how long have you been hauling water from the river?" "Eighteen years, yer honor." "Well, now, Pat, how much water have you hauled in that time?" "All yez don't see in the river, yer honor!" (Laughter.)

We find things very placid and very pleasant here, and we have come to enjoy them, and expect to enjoy them. The "Buckeyes" are with us to make us have a good time, and we intend to have it.

On behalf of the American Pharmaceutical Association I thank the people of Put-in-Bay Island, through the Mayor and the Ohio State Association, through Prof. Lloyd, for the kind words of welcome extended us.

Mr. Good's response was applauded.

The chair announced that it was now in order to read the President's Address, and called Mr. Wm. S. Thompson, chairman of the Council, to preside while he did so.

The President's Address was as follows:

Fellow Members of the American Pharmaceutical Association—Ladies and Gentlemen:

We meet together in this the last year of the present century, amidst the beauties of nature as she has unfolded herself in the great and prosperous old Buckeye State, and again are the open hand, the smiling eye, and the gladsome heart of all our fellow members mutually extended and received.

These annual meetings are like delightful picnic groves, marking the way as milestones as we pass onward through the journey of our usually more or less monotonous existence. We all look back to those that have passed as among the most pleasant recollections of our lives, and look forward to those that are to come as a royal treat in store, where after an interval of a year we shall again meet the dear faces of our friends and fellow members.

I am sure I am more than delighted to meet you all again, and to express to each and every one of you the wish that the year that has intervened since we last met on the shores of the historic Chesapeake Bay, may have spared you from serious cares and troubles, and has encouraged you to hope for still better things and increased prosperity.

We all know that it has been a good year, and a prosperous one, in all lines of trade and commerce, and I believe the pharmacist has this year enjoyed at least a share of that prosperity which has for so many years been characteristic for its absence from his threshold.

Our country has entered upon a new career, and has created a new chapter of history for herself, by emulating the example of other civilized nations and taking up the white man's burden of enlightening the heathen and savage. What this departure will result in for our country and her citizens, is a matter of conjecture at present; but that it will stimulate commerce, industry and enterprise can hardly be gainsaid, even by the most ardent follower of the senior Senator of Massachusetts. Whether or not it will inure to the advantage of the Treasury is problematical, when gauged by the dollar and cent scale; but that it will greatly augment the fortunes of many of the citizens, and thereby increase their prosperity and wealth, is more than probable.

Duties will devolve upon pharmacy as the result of this new departure—imperialism, as it is called, by those opposed to our new acqnisitions, for want of a more ironical appellation—for no doubt the heathen and semi-civilized inhabitants whom we have undertaken to enlighten will be found to be sadly in need of pharmacies and of the most advanced phases of the healing, compounding and dispensing arts.

The now famous Rough Rider, Governor Roosevelt, whom even his political enemies, if he has any, must admire on account of his personification of all that is noble in politics and the betterment and advancement of his fellow-men, has put the case of the misnamed imperialism more strongly and pointedly, when in a recent public utterance, he said, "That it is the duty of every good citizen not to cavil and rail at what our government is doing and accomplishing, for no matter what it would do, many would find fault with it, but rather to accept it as a noble achievement of our country and make the best of it for himself and for his fellow citizens, and furthermore, that it is characteristic of a strong, virile and healthy country to not only sit still, accumulate wealth and feed the world, but to play a role in the history and advancement of the same."

It is true that many, and possibly the majority of our most intelligent citizens, are naturally still influenced by the wise doctrines and ideas held by the fathers of this republic, Washington, Jefferson, Madison and Monroe, who advocated "Non-interference with the affairs of European states, or in fact with those of any other country," but the conditions then existing have undergone great changes during the past century of marvelous progress and development. Our population and wealth have increased enormously, as well as our commercial relations and interests. American skill and enterprise

have invaded and scored successes in every quarter of the globe, and to protect our growing commercial and industrial interests against keen and aggressive competition, this country must take its proper place among the great nations who assist in framing the international policies and relations advancing and extending civilization. The acquisition of these foreign territories came about as the result of a war not of our seeking, and as events have so shaped themselves as to make these people our wards, we cannot retrace our steps without incurring ignominy and obloquy, and it becomes our duty to take up this burden that Mr. Kipling has so gracefully termed "the white man's burden," and bear it manfully and cheerfully.

We as pharmacists naturally take our share in these duties. We know full well that in pharmacy the United States stands second to no other civilized land, and many important pharmaceutical processes and methods as well as the numerous valuable galenical preparations which have been recognized not only in our own, but also in the pharmacopœias of other countries, owe their origin to the skill and ingenuity of the American pharmacist. We are justly proud of our Pharmacopœia, which is now considered a model for other countries, and which so creditably reflects the skill and progressive spirit of the American pharmacist.

Our colleges of pharmacy are doing most excellent work, and are giving a thorough training to thousands of young pharmacists, sending them out well-equipped and fitted for their important duties. It is hence distinctly in line with "the white man's burden" policy to extend our influence and usefulness as skilled pharmacists to the benighted countries which we are to enlighten and civilize. It will open an immense field for our aspiring and enterprising young pharmacists, and should aid in giving a quietus to the universal plaint of too many pharmacists and too many pharmaceutical colleges that we hear on all sides. I would venture to prophesy that before many years have gone by, many of our younger graduates will be found as prosperous holders of pharmacies in the West Indies and Philippine Islands, spreading the fame of their country and their alma maters by their progressive and scientific attainments, thus lightening "the white man's burden" to civilize and enlighten the heathen.

Speaking of this cry of too many pharmacists and too many pharmaceutical colleges brings me to the subject of special interest to this Association, namely, the evidently approaching era of too many associations, and hence necessarily of too many divided interests and divided efforts for betterment in our calling. A close examination into this subject reveals a rather alarming condition as far as the future of this Association is concerned. An apparently strong, vigorous, rival association, national in its character and scope of influence, has sprung into life at one bound, and will possibly wield quite an influence as to the future usefulness and development of our Association.

We have existed now peacefully and successfully these forty-seven years and have, I think we all truthfully and proudly admit, accomplished much for the advancement and betterment of our profession. That most of the scientific research and mechanical ingenuity which enabled us to so eminently advance our profession was either the direct result of our meetings and publications, or was stimulated directly or indirectly by our Association, is a fact that none of us should forget, although the American Pharmaceutical Association did not and probably could not teach us how to make our stores yield us a handsome income, or give us a sure means of remedying the cut-rate evil.

I think it but just and proper to enter a protest at this point against some statements which have found their way into the pharmaceutical and daily press, insinuating that this Association is not of or for the retail pharmacist, but is rather controlled by and exists for the benefit of the college professor and the large manufacturer. Such statements are as unjust as they are uncalled-for, and are certainly untrue. No one class of our members is benefited more by virtue of the American Pharmaceutical Association than another. We are all benefited as we should be if the purposes of the Association and its mission

are fulfilled. The retailer has been benefited by the information gained and by associating with his professional brethren, and has thus broadened his ideas and methods of business and improvements generally. The professor has gained by making himself known, and bringing before the pharmacists of the land his ability as a pharmaceutical thinker, teacher and investigator. The manufacturer has gained by meeting the retailer and thus coming into closer touch with him than he could through the medium of the letter carrier. He has also gained by presenting before the Association the results which improved processes and manipulations on a large scale and his scientific researches have achieved, which benefit pharmacy in general as well as himself.

All the retailers, all the professors and all the manufacturers have not gained equally, however, and naturally not. Some have not, because they have not the ability to cope successfully with their fellow pharmacists, retailers, professors or manufacturers; others because they lack the qualifications necessary to success in business or life. This is natural, and only another illustration of Darwin's great law. But as I have indicated before, the representation of all the above classes of pharmacists in one association was and is necessary to produce the beneficent effects and benefits which all must admit have already been produced by the influence of this Association, and the annual fraternal meetings of its members in the past.

The beneficent results already attained will even be greater in the future, if we only make the proper efforts in our united strength to bring the influence of the Association to bear on the amelioration, if not extermination, of existing evils, whilst a divided association and clannishness might fail to produce this result.

What I have just said applies, as you all no doubt have ere this observed, to the National Association of Retail Druggists, which has sprung into existence since our last meeting, and which is now very actively engaged in the very laudable attempt to eliminate the much dreaded and despised cut-rate evil. That this Association should have been formed for this specific purpose was not unexpected, or for that matter, uncalled-for.

The effort to ameliorate this crying and growing evil was a laudable one that this Association has often tried to solve, as have many other associations, unsuccessfully so far, and I sincerely hope the N. A. R. D. will succeed in its efforts. I am sure I voice the sentiments of you all and of practically every member of this Association when I say that we are thoroughly in sympathy with their effort, and hope it may be eminently successful.

Was it, however, in keeping with advanced thought, modern ideas or fraternal feelings to make one of the clauses of the constitution of this Association read that "No college professor or manufacturer shall be eligible for membership"? Whether or not these two classes of pharmacists would have desired or would have applied for membership is an open question; but is the inference to be drawn the correct one, that the college professor and the manufacturer have prevented or will prevent the success of the problem the N. A. R. D. has tried to solve? I sincerely hope it is not. No college professor in the country and no manufacturer in the country to-day would raise one finger to prevent the success of this problem to eliminate the cutter. On the contrary, I am sure that every professor and every manufacturer would go to some trouble and no doubt to some expense to aid in accomplishing such a result, for both would greatly benefit in every way by this elimination.

In connection with this I would draw the attention of our Association, and in fact the pharmaceutical profession generally, to the important work done by a committee of the larger pharmaceutical manufacturers and some jobbing houses, which may be known to but few of them. This committee brought strong influence to bear on the Commissioner of Internal Revenue and his deputies, experts, etc. to interpret the new stamp duty on proprietary medicines and such similar preparations, affecting nearly every retail

druggist in the land, in a fair and equitable manner and in harmony with the intentions of the framers of this special legislation. Many weeks, aye months, were spent in consultation with these officers and experts of the government, and many professors and pharmaceutical experts, such as Professors Remington, Caspari, Sadtler, Culbreth, Lloyd and others; even our worthy ex-president, Mr. H. M. Whitney, being brought into evidence to interpret this section of the new revenue law in conformity with reason, justice and equity, so as not to make it a still greater burden for the back of the already overloaded apothecary. The first intention of the government experts had been to interpret this law as rigorously as possible, and to bring under its scope almost every tincture, syrup or compound generally sold in the drug store. It is to the exertions and strong efforts to modify these decisions, by these various manufacturers and their representatives, that the pharmacist owes the construing of the law which permits him at least to sell his laudanum, paregoric, castor oil, seidlitz powders and the thousand and one different items that enter into his daily sales, without being compelled to stick a stamp on every such package. Personally, I am sorry that an independent organization should have been deemed necessary in order to accomplish the elimination of the price-cutting evil, for the more divided the numbers and interests of any class of men or branch of trade, the less the influence they wield generally, in accomplishing reforms or influencing legislation.

The very good work the N. A. R. D. has accomplished could in all probability have been accomplished as effectually by the American Pharmaceutical Association, provided the right men had been found to take the work in hand, and if the membership had been increased to make it a still more representative body of American Pharmacists. Had the men who now dominate, lead and push the N. A. R. D. been members of the American Pharmaceutical Association and taken hold of our commercial section as they have that of the N. A. R. D., the same results I feel sure would have been achieved.

Confronting the facts as they are, and not as they might have been, however, the N. A. R. D. appears as a splendid and deserved success. As a sister organization, I heartily congratulate it upon its apparently certain successful mission of squelching the cutter. My highly esteemed and beloved predecessor in office, H. M. Whitney, proved to be, as he has on many previous occasions, a sooth-sayer and leader, whose foresight was accurate and trustworthy; for in his address last year, as you will all remember, he dwelt more strongly than on any other topic upon the crying necessity of encouraging the Commercial Section and making the work of that Section the prime object of our concern and work.

But, ladies and gentlemen, no matter how essential it may be to foster and encourage the commercial branch of our membership and to strive with our new sister Association to accomplish a reform and improvement in our business and financial relations, there is ample room left for other important aims. There is more in pharmacy and in the aims of our Association by many and many an acre than the restoration of old prices. Pharmacy is as much a science and profession as it is a commercial calling, and its advance always has been and always must be in the channels of scientific research. Think of what has been accomplished during these last fifty years. Compare the armamentarium of the physician and pharmacist then and now. Then think of the comparative paucity of our knowledge of many, yea, hundreds of drugs so largely used to-day. Shall we always remain in ignorance of this knowledge? By no means. Let the light of advanced knowledge fall and fall full into the intricacies of these unknown quantities of our shelves, and let the investigation of drugs go on; above all, let the American Pharmaceutical Association continue to grow in its efforts to open the crannies and let the light in.

Our Scientific Section, as usual, this year invites your attention to some very interesting papers.

The Educational and Legislative Section as well has continued the good work for which

it has been so highly lauded in the past, and I am sure the respective chairmen of these two sections, and also of the Commercial Section, will have merited and should receive our sincere thanks.

Our Commercial Section very probably suffered somewhat by the remarkable work accomplished and interest excited by the N. A. R. D., but I hope that we will all show that we are as much interested in the work of this section as in that of any of the other sections.

The new committee on practical pharmacy which, upon the urgent appeal of several of our active members, was inaugurated at our last session in Baltimore, will bring in its report within a few days and give us an account of its labors, which I know have been pushed most actively by its hustling chairman, Mr. Hynson. I bespeak for their report and labors your earnest attention, feeling sure that the appointment of this committee is a move in the right direction, and that their labors will add new zest and interest to our annual gatherings, covering a field that is of special and practical interest to all retailers and pharmacists.

Our General Secretary has as usual been untiring in his efforts to push along his always increasing work. He has kept the machinery of the Association moving and has gotten out the Annual Proceedings this year in practically three months' time after the adjournment at Baltimore. All who are at all familiar with the prodigious amount of labor that this work entails will join me in congratulating the Association in having so efficient and thorough an officer in this important position.

If you will permit me, I will at this time make a suggestion to the Association which I trust will meet with your unanimous approval. The large amount of mental and physica labor, and long and continuous personal attention that is required of our General Secretary certainly is worthy of a much better remuneration than he is now receiving. As is well known to all the members of the Council, permission was given to our Secretary at our last meeting, in order to facilitate and hasten along the publication of our Annual Proceedings, so as to enable us to have this valuable publication in the hands of our members at as early a date as possible, to engage sufficient help to accomplish this end, and a certain sum of money ($500.00) was appropriated for the purpose. But owing to the peculiar nature of this work, requiring particular familiarity with all subjects appertaining to the Association, and also editorial qualifications, etc., it was found that but little use could be made of this intended relief for the Secretary, and hence but a small sum was used of this appropriation, mainly for assistance in proof-reading. Nearly all the work had to be performed by the Secretary himself. I would therefore urgently propose to make the salary of our General Secretary One Thousand Dollars per annum from now on. Not that I think even this small sum adequate remuneration for this work, but only as a mark of approval on our part of his labors, which unfortunately a lack of financial resources will not permit us to make as generous as we would like to make it. I would state here that I have learned that the position of secretary of similar associations, probably not financially better provided than we are, and where the labors are much less in quantity at least, as, for instance, the American Medical Association and the Association for the Advancement of Science, are paid at a much higher rate.

Our worthy Treasurer, the financial custodian of our wealth, has as usual served us with undiminished zeal and fidelity, and his report will be listened to with that attention that so important a subject requires at our hands, and such suggestions as he may lay before us will no doubt meet with the consideration that they have always received from our memberthip. His labors, too, are such that they partake more of labors of love and attachment to the Association rather than those of an officer with adequate remuneration for his services. Let us hope that the result of our year's financial outcome will be a favorable one, indicating rather an increase in membership and financial resources and hence also of general prosperity.

Full appreciatian is again due our veteran Reporter on the Progress of Pharmacy, Prof. C. Lewis Diehl, who for nearly a quarter of a century has furnished our members with an annual report which enhances greatly the value of our Proceedings, and has called forth merited praise from sister societies. Let us hope that for years to come, our Reporter may be spared good health, and give this Association the benefit of his judgment and ripe experience.

The metric system. Feeling confident that it is in the direction of advancement and progress to have a uniform system of weights and measures all over the civilized world, and believing that no other system equals the metric system in simplicity and practical value, I advise the continued efforts of this Association to have the Congress of the United States adopt it as the official system of weights and measures of this country. The United States Pharmacopœia has long since adopted it, and it would hence not be a radical departure to have the system generally adopted—certainly not as far as the pharmacist is concerned. In order that this suggestion may bear direct fruit, I would urge that our committee on weights and measures, which I think embraces a member from each state of the Union where we have membership, make a determined effort at the next session of Congress, by either appearing before them in a body or by a central committee as large and influential as possible, and again present before the Committee on Weights and Measures of the House of Representatives and of the Senate, and urge the necessity of making a move in this direction at this favorable opportunity the beginning of a new century. The change will surely come about sooner or later, and we being among the principal users of weights and measures should certainly be active in its accomplishment, especially as our Association is and has been practically a unit in favor of its adoption.

At the last annual meeting, a resolution relative to the introduction of the metric system in medical schools was adopted, and the General Secretary was instructed to forward a copy of the resolution and the committee report to the various medical colleges. In November last, the Secretary sent copies as directed to 235 medical schools, but replies from only four have come to hand, namely, the Woman's Medical College of New York, the Yale University Medical School, the Missouri Medical College and the Kentucky School of Medicine. Of these only the last-named was enthusiastic in tone, and promised to bring the matter up at the next meeting of the Association of American Colleges.

Decennial meeting of the Revision Committee of the United States Pharmacopœia.—The first official call for the seventh annual revision of the United States Pharmacopœia has been published by the secretary of the committee, Dr. Castle, of New York, and as our Association is to be represented in the convention that elects the Committee of Revision and Publication of the Pharmacopœia, I would suggest that we appoint our delegates to the same during this meeting. There can be no doubt that numerous and radical changes will be made in the next Pharmacopœia, for since the publication of the last, many important discoveries have been made and much valuable work has been done, especially in the line of valuation and standardization of drugs. Numerous new preparations are clamoring, by almost universal use, for admission.

I am glad to be able to say that our *Research Committee* has done considerable and very creditable work in the direction of clearing up dark corners of the Pharmacopœia, and no doubt their work will meet with the recognition it deserves at the hands of the next Committee of Revision.

The Pure Food and Drug Congress again met this year at Washington, early in January, and our Association was well represented by a strong delegation. Considerable debating and resolving was indulged in during the sessions, and many valuable addresses by able and eloquent orators were listened to with much attention by the delegates. We trust some impression was made on Congress, as well as on the public in general, in regard to the importance of judicious legislation on this all-important subject. It seems

that a lack of the necessary funds to circulate information and literature to the different sections of the country was much lamented, and many suggestions were made to secure such support of money and means by the members and officers of the Congress.

We hope to hear the Chairman of the delegation representing our Association, W. S. Thompson, lay before us his report upon this subject, when possibly it would be well and but our duty to contribute to such a fund to keep up this agitation until a proper law has been adopted by Congress.

The importance of the Congress to the pharmacist in particular and the public in general is, I fear, generally under-estimated. No more important legislation affecting pharmacy has probably ever come up for consideration than this Pure Food and Drug Law of Mr. Brosius, of Pennsylvania; for when it becomes a law of the land, the unscrupulous competitor will be removed, the man who adulterates in order to undersell, and substitutes inferior products in order to obtain an advantage over his honest competitor, will cease to exist; at least, let us hope so. Not to view the matter, however, in a selfish or narrow manner, but to look at it from the broader standpoint of the general public, the advent of such a law will mean assurance to the public of pure foods and drugs, both matters of vital importance and interest to it, and I hence think it wise for this Association to send to the Pure Food and Drug Congress, at its next session, a resolution strongly advocating the same.

Work of the Committee on National Legislation. We shall no doubt receive an exhaustive report from the Chairman of this important Committee, and I ask your careful attention to the same, as it involves matter of vital interest to every pharmacist in this country, particularly the action likely to be taken by Congress in regard to a much needed revision of the Patent and Trademark laws.

A copy of the resolution adopted at the Baltimore meeting, together with a copy of the Committee's last report, was duly forwarded to the three members of the Government Commission, Messrs. Forbes, Grosscup and Greely, both at New York and Washington, but no acknowledgment or receipt, or other communication, has ever been received by the General Secretary. Dr. Stewart, our Chairman of the Committee on National Legislation, who was present at the meeting of the Commission, will probably be able to inform us as to the action taken in regard to the request from this Association for aid in the mitigation of existing evils.

Requests to change date of annual meeting. There have been as usual a number of requests made to me personally and to different members of the Council to change the date of this meeting, generally for an earlier date; but after mature consideration of these requests, and after consultation with the Chairman and other members of the Council, it was thought advisable not to comply with them, as it would have caused disturbance of arrangements already made by the Local Secretary and Entertainment Committee, and would probably have caused more dissatisfaction and disappointment to many members who had already made their arrangements for this, the officially appointed date.

A strong appeal was also made by one of our prominent members, Prof. Kremers, of Wisconsin, to change date of meeting, so as to let it either immediately precede or follow the meeting of the American Association for the Advancement of Science, which meeting took place at Columbus, in this State, August 19th to 26th, inclusive, as many members of our Association could thus attend both gatherings with no loss of time and less expenditure. It was also argued that possibly a somewhat closer affiliation with this Association, which has many aims in common with us, would be both desirable and profitable. I would lay this suggestion before our members, who will ponder over the subject, and probably debate the question at one of our sessions. Whilst I could not agree on this last suggestion with my friend Prof. Kremers, who particularly dwelled upon the desirability of such a move, nor could I encourage a change of date of this meeting for reasons already elaborated, I would certainly suggest that it come up before

us later on, when also the date of our next meeting could be so arranged, if thought advisable, to meet the views of such of our members who may be members also of the American Association for the Advancement of Science.

DEATH OF PROMINENT MEMBERS OF OUR ASSOCIATION.

During the past year, so fruitful of changes connected with the drug business, and naturally also of our beloved Association, we have to deplore and mourn the loss of many of our members by death. Whilst, no doubt, our worthy Secretary of the Council and of the Committee on Membership will give us an account and the usual obituary notices of all our friends and fellow-members who have departed for the "land from whose bourne no traveler has yet returned," I cannot refrain from drawing your special attention to the names of two of the oldest and most esteemed members, both ex-presidents of the Association. They were frequent attendants at our annual meetings, and their loss will be keenly felt and mourned by their hosts of friends. I refer to Chas. A. Heinitsh and John Ingalls. Both were with us yet at our last gathering in Baltimore, and both seemed to enjoy so much the meeting with their many friends and associates. Then apparently so full of life, and a few months later grim death had seized them for his own. We shall miss their genial presence at many future meetings, but their memory will linger with us for years and years to come, and often shall we recall the many happy, profitable hours spent in their company. The older membership of this great Association is gradually thinning out very perceptibly. The fiftieth anniversary which is now fast approaching will probably leave us with very few members who in the fifties were the prominent and faithful workers in the fields of scientific and progressive pharmacy in this country.

The names of Wm. Proctor, Jr., Edward Parrish, Samuel Colcord and many of their compeers, who have long since been called to their last homes, and the name of Alfred B. Taylor, who but so recently left us to join the silent majority, will be easily recalled to memory by our older members, and now only two of the original 18 delegates that met in Philadelphia in 1852, to organize the American Pharmaceutical Association, are left among the living—Mr. David Stewart, of Baltimore, now living in Port Penn, Del., (but who has not been a member for many, many years), and Mr. Eugene Dupuy, of New York, now living in Brooklyn, still a member, having been with us uninterruptedly for 47 years.

Membership.—The question of increasing our membership comes up perennially, and many suggestions have been made to bring this so much desired increase about; but the success of all such attempts has in no case been above mediocrity.

The question naturally always comes up as to what benefit the pharmacist will receive in return for his annual fee, and when he is told that he thereby enters the circle of The Pharmaceutical Body of the United States and receives a copy of the Proceedings, he often cannot or will not see the advantage of joining our circle. To some pharmacists the volume of Proceedings is of little value or interest, and merely becomes a shelf warmer, but I believe the time is coming when this publication will be fully appreciated as a most valuable book of reference by the great majority of pharmacists of this country; for standards are all tending upwards, and this means greater interest in pharmaceutical literature, that not only gives formulas for lotions, perfumery, tooth-pastes, etc., but rather scientific research of positive interest and value. I would strongly urge increased efforts on the part of our Committee on Membership, the Council, and, in fact, all of our members to bring the thousands of pharmacists in the land within our fold. When we consider that we number only about 1,400 members, whilst the pharmacists of our country aggregate nearly a hundred thousand, from which we can draw for our membership, it looks as if this Association were known to but few, and our work these many years for the betterment of pharmacy were but little appreciated or valued by the great majority.

Our State Associations, which meet annually, should be a good field from which to

recruit our membership, and if the value of our work were placed before the members of these varied State Associations, in forceful and eloquent language, the result to us would be a good harvest of valuable members, and new blood for our venerable but ever active and live Association.

In conclusion, let me express the hope that our meeting this year will be eminently successful in every way, and that we may all feel, when parting, to meet again next year in some other section of our great country, that we have thoroughly enjoyed ourselves, and feel amply repaid for having accepted the kind hospitality of our brother pharmacists of the great State of Ohio.

There was prolonged applause when the President finished the reading of his address.

THE CHAIR: Gentlemen, you have had the pleasure of listening to a very able and interesting address from your President. What is your pleasure?

Mr. Selzer moved to refer to a committee of three, for consideration and report at a later session. Carried.

The Chair appointed as such Committee on President's Address Messrs. H. M. Whitney, of Massachusetts: John F. Patton, of York, Pa., and Edward Kremers, of Wisconsin.

President Dohme resumed the chair.

THE PRESIDENT: The next order of business is the report of the Committee on Credentials. Is the committee ready to report?

Mr. Good, chairman, then read the report of the committee, giving the following list of Associations and Colleges that had named delegates to this meeting of the American Pharmaceutical Association:

REPORT OF COMMITTEE ON CREDENTIALS.

The Committee on Credentials appointed by the Chairman of the Council, beg leave to report that they have performed the duty assigned them, and find delegates accredited from

Colleges of Pharmacy—Albany, Atlanta, Chicago, Cleveland, Louisville, Maryland, Massachusetts, Montreal, National, New York, Ontario, Philadelphia, St. Louis, University of Minnesota—14.

State Pharmaceutical Associations—Alabama, California, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, Province of Quebec, Rhode Island, Tennessee, Texas, Vermont, Virginia, Wisconsin—26.

Alumni Associations of Colleges of Pharmacy—Cleveland, Maryland, Philadelphia, St. Louis—4.

Schools of Pharmacy—Northwestern University—1.

National Associations—The Proprietary Association, Association of Retail Druggists, Wholesale Druggists' Association—3.

Local Associations—Cleveland Pharmaceutical Association, German Apothecaries' Society of the City of New York, Kings County Pharmaceutical Society, Manhattan Pharmaceutical Association—4.

JAMES M. GOOD,
WM. L. DEWOODY,
GEO. W. PARISEN.

THE PRESIDENT: Gentlemen, you have heard the report of the Committee on Credentials. With regard to the delegates that are here from sister associations, I greet them and welcome them to our meetings; and if any of the delegates wish to make any statement here, we shall be glad to hear them. We should like to hear from the delegates present representing the N. A. R. D.

Mr. Jones spoke for the delegation as follows:

Mr. President and Gentlemen: I have been a member of the American Pharmaceutcal Association for a great many years, and have attended a great many of its meetings, but on this particular occasion it affords me especial pleasure to appear as the representative of the National Association of Retail Druggists. I believe this organization will go hand in hand with the American Pharmaceutical Association. I see no reason why it should not be united, if desirable, with the American Pharmaceutical Association. There is no question in my mind that as time advances our business interests, our commercial interests, are becoming equal, if not superior, to our professional interests. Take the matter of prescriptions, for instance: Ten or fifteen years ago we possibly compounded 70 or 80 per cent. of our prescriptions. To-day I question if thirty per cent. of those that come into the ordinary retail store do not call for proprietary or patented articles of some sort, in some way. The unfortunate condition that prevails with the retail druggist to-day takes him from the high standard he ought to adopt. I can speak authoritatively of my own city—Louisville. We are conservative to a very great extent; but when people advertise to sell prescriptions at cost, and patent medicines at cost, I don't see what is left for us to do but to drill that class of men out of the business. I believe if these two organizations will combine and work together—the Commercial Section of this Association and the N. A. R. D. working as an adjunct of this Association, but independently—we will accomplish a great deal of good in lifting the profession and making it honorable, and contribute to the pecuniary advancement of us all. (Applause.)

THE PRESIDENT: If any of the other delegates wish to make remarks, we shall be glad to hear from them.

Mr. Frank A. Cheney, representing the Proprietary Association, arose and spoke as follows:

Mr. Chairman and Gentlemen of this Association: I assure you that not only I, but the gentlemen whom I to-day represent, appreciate the honor of this invitation to address you, and thank you for this courtesy so characteristic of so great and important a body, a body influential in business and valuable in aiding the civilizing tendencies of the times.

The development of the retail drug store has been marvelous. A few generations ago drugs were procured at the office of the physician, at the general store and at the "Apothecary's," such as it was. Now a splendid army of forty thousand educated, experienced pharmacists distribute the health-sustaining medicines and druggists' supplies from the most elegant stores and choicest corners and locations in the villages and cities in America.

The people have learned to go to the druggist for advice and purchase, and in innumerable instances safely rely on his learning and wisdom. His business place has become a store radiant with light and beauty. The druggist is now a gentleman who possesses a certificate reciting a skill and learning which has brought him the unreserved admiration and respect of the community in which he lives.

Side by side with this marvelous progress of the retail drug trade has been the trade of the proprietary medicines. It might seem immodest for me to speak very highly of

their intrinsic value, but I can say this, that a great many of them are prepared from formulas presented by the best intellects of the medical profession, and have for their continued popularity the same base as the popularity of the modern drug store, the approbation of an intelligent and discriminating people.

I hope, gentlemen, that this meeting and this place will be conspicuous for the renewal of pledges to stand by our mutual interests and support the enormous business we all have built up. I thank you for your kindness and attention, and hope your duties may be attended with the delights always found on this beautiful island.

There was no response to a call for remarks from delegates from the National Wholesale Druggists' Association.

MR. REMINGTON: Mr. President, as there does not seeem to be a representative from the National Wholesale Druggists' Association present, I think it would be proper to announce that if any of them should arrive, they are invited to address the Association.

THE PRESIDENT: Of course, that is understood, and we shall be glad to hear from them.

The Secretary announced that at this stage of the proceedings it was customary to call the list of Standing and Special Committees for their reports, the same to be read by title only at this session, or a synopsis given, the reports to be treated more fully at the second session.

The following committees were called:

Committee on Transportation—Albert E. Ebert, Chairman.
" " *Revision of the U. S. Pharmacopœia*—Leo Eliel, Chairman.
" " *General Prizes*—J. O. Schlotterbeck, Chairman.
" " *Ebert Prize*—H. M. Whelpley, Chairman.
" " *National Legislation*—F. E. Stewart, Chairman.
" " *Nomenclature of Materia Medica Titles*—A. B. Lyons, Chaiaman.
" " *President's Address of 1888*—H. M. Whelpley, Chairman.
" " *Patents and Trade-marks*—Wm. Bodemann, Chairman.
" " *Meeting of 1900*—W. C. Alpers, Chairman.
" " *Weights and Measures*—F. G. Ryan, Chairman.
" " *Status of Pharmacists in the Army, Navy and Marine Hospital Service in the United States*—Geo. F. Payne, Chairman.

Report of Delegates to the Section of Materia Medica, Pharmacy and Therapeutics of the American Medical Association—Geo. B. Kauffman, Chairman.

Report of Delegates to the National Wholesale Druggists' Association—Jas. M. Good, Chairman.

Report of Delegates to the National Pure Food and Drug Congress—Wm. S. Thompson, Chairman.

The President announced that the next business to come up before the Association was the formation of a Nominating Committee, and suggested that a recess of five or ten minutes would be desirable in order to give the delegates from the various States an opportunity to confer as to the two representatives on the committee each State represented at the Association was entitled to.

On motion of Dr. Reed, duly seconded, the Convention thereupon took a recess of five minutes for the purpose indicated.

Upon reconvening, the Chair announced that the Secretary would call the roll of the States, Territories and Provinces, and requested that the different delegations give in the names of those selected as members of the Nominating Committee. The Secretary called the roll, and the following names were presented:

Alabama—J. L. Wikle.
Arkansas—W. L. Dewoody, E. F. Klein.
California—R. G. Eccles.
Connecticut—Thos. F. Main, Chas. Rapelye.
Delaware—Herbert K. Watson.
Dist. of Columbia—Wm. S. Thompson.
Illinois—C. S. N. Hallberg, Oscar Oldberg.
Indiana—J. N. Hurty, Leo Eliel.
Iowa—C. D. Wangler, F. Howard.
Kentucky—W. H. Averill, S. N. Jones.
Louisiana—F. C. Godbold.
Maryland—J. Webb Foster, H. P. Hynson.
Massachusetts—H. M. Whitney, L. D. Drury.
Michigan—A. B. Lyons, F. E. Westervelt.
Minnesota—Miss J. A. Wanous.
Missouri—Jas. M. Good, O. W. Krueger.
New Jersey—D. L. Cameron, G. W. Parisen.
New York—G. Ramsperger, Geo. J. Seabury.
Ohio—G. L. Hechler, O. B. Hannan.
Pennsylvania—Jno. F. Patton, F. W. E. Stedem.
Rhode Island—Mason B. Wood.
Tennessee—E. A. Ruddiman.
Texas—K. R. Forston.
Vermont—W. E. Terrill, F. W. Pierce.
Virginia—A. E. G. Klor, T. Ashby Miller.
Wisconsin—Edw. Kremers.
Province of Quebec—Thos. D. Reed.

The President announced as delegates-at-large upon the Nominating Committee Messrs. Joseph P. Remington, George W. Sloan, Albert E. Ebert, H. M. Whelpley and George W. Voss.

The chair also announced that the Secretary of the Council would now read a list of names proposed for membership in the Association.

Mr. Kennedy thereupon read a list of 45 names that had been proposed, and, upon motion of the General Secretary, he was directed to post the list for inspection, according to the usual rule.

The chair announced that it was now in order to appoint a Committee on Time and Place of Next Meeting, to report at the next session, and named as such committee the following: S. A. D. Sheppard, of Boston; T. Ashby Miller, of Richmond; W. S. Thompson, of Washington City; W. C. Alpers, of New York, and Henry P. Hynson, of Baltimore.

The Secretary said he had received several communications in regard to time and place of next meeting, and he would like to turn them over to the committee just appointed, which, upon motion of Mr. Mayo, he was directed to do.

Mr. Kennedy: Mr. President, I wish to move that the gentlemen whose names have been read for membership be now invited to become members of the Association, if there is no objection.

The motion was seconded by Mr. Remington and prevailed.

On motion of Mr. Remington the convention then adjourned until to-morrow (Tuesday) morning at 10 o'clock.

Second Session—Tuesday Morning, September 5, 1899.

The Second General Session of the Association convened at 10:30 o'clock Tuesday morning, September 5th, President Dohme in the chair.

The Secretary read the minutes of the first session, and the chair announced that, without objection, they would stand approved as read, and it was so ordered.

The Secretary of the Council was called upon to read the minutes of the several sessions of that body which had been held, and he did so as follows:

Second Session of the Council—September 4, 1899.

Council convened at the Hotel Victory, Put-in-Bay, O., at 10:15 a. m., with the following members present: Messrs. Dohme, Diehl, Caspari, Good, Sheppard, Lyons Remington, Kennedy, Rusby, Hopp, Rapelye, Whitney and Chairman Thompson, who presided.

On motion of C. Lewis Diehl, the reading of the minutes of the previous session was dispensed with.

The Secretary of the Committee on Membership presented the names of sixteen applicants for membership, which on motion were ordered to be presented to the Association.

Chairman Thompson appointed Messrs. J. M. Good, W. L. Dewoody and Geo. W. Parisen a Committee on Credentials with directions to report to the Association at large.

Chas. Caspari, Jr., read the report of the Committee on Publication which, on motion of Geo. W. Kennedy, was accepted and adopted and the thanks of the Council extended to the General Secretary for the promptness with which the volume of Proceedings for 1898 were issued.

REPORT OF THE COMMITTEE ON PUBLICATION.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

Gentlemen: Your Committee on Publication beg leave to report that the Proceedings of the forty-sixth annual meeting have been duly published. In accordance with a resolution adopted at a meeting held in Baltimore in August, 1898, demanding an early issue of the Annual Report of Proceedings, the editor felt called upon to rush the work with all possible speed, but unfortunately failed to complete the task within 90 days, the time limit prescribed in the resolution. It required 107 days from the date of adjournment of the last meeting to the beginning of delivery of the book on December 29th, in explanation of which it may be stated that the volume for 1898 is the second largest ever published by the Association, and contains 376 pages (44.3 per cent.) of matter more than the preceding volume, besides which several days of delay were incurred by failure on the part of authors to return proof promptly. This latter feature is one likely to be again met with, for the right to correct the proof a paper submitted can hardly be denied an author, and immediate attention may not always be possible. No one can know in advance of the meeting what volume of business or what number of papers is likely to be presented, and unforeseen delays in the issue of the Proceedings may arise annually, so that the time fixed by the resolution of 1898 for the delivery of the book hereafter to members, within 70 days after adjournment of the meeting, may not prove at all feasible, no matter how earnest the desire and work of the editor.

The Association having generously placed the sum of $500.00 at the disposal of the

editor to be used in carrying out the demands for an early issue of the Proceedings, some help was employed and $59.50 expended therefor, leaving a balance of $440.50, available for future issues. The work of editing and publishing our annual Proceedings is chiefly of a kind requiring the personal attention of the General Secretary, who is charged in the by-laws with this work, and but little of it can be delegated to others, so that a considerable increase in clerical aid cannot be availed of to advantage.

To all members entitled thereto, according to the Treasurer's accounts, a copy of the 1898 Proceedings was delivered during the month of January, besides about 100 complimentary copies were sent to our honorary members, state libraries, educational institutions, pharmaceutical journals and foreign scientific bodies.

As in the past three years, 1,500 copies of the book were again printed, of which 250 have been allowed to remain unbound (in flat sheets); thus far 1,185 copies have been bound in cloth and 65 in paper covers, of which 82 remain on hand at the present date. It was also found necessary to bind in cloth 58 copies of last year's issue, the stock on hand having been exhausted. Owing to the large increase in volume of the 1898 Proceedings over those of 1896 and 1897, the cost of publishing and delivering the same has been also necessarily increased, as will appear from the following items:

Composition, paper and press-work (1,500 copies)	$2,218 19
Binding 1,185 copies in cloth @ 24 cts	284 40
Binding 58 copies in cloth @ 20 cts	11 60
Binding 65 copies in paper @ 10 cts	6 50
Illustrations, including 2 frontispieces	62 90
Expressage (cloth, 31 cts.; paper, 26 cts.)	344 08
Postage (Foreign and Domestic, cloth, 33 cts.; paper, 25 cts.)	34 31
Journals for Use of the Reporter	46 87
Salary of the Stenographer	125 00
Salary of the Reporter on the Progress of Pharmacy	750 00
Expense of Assistance in Proof-reading, etc.	59 50
	$3,943 35

July 1, 1899. Respectfully submitted,

CHAS. CASPARI, JR., *Chairman.*
C. LEWIS DIEHL,
JAS. M. GOOD,
CASWELL A. MAYO,
H. H. RUSBY.

C. Lewis Diehl presented a report on a proposed Epitome of the National Formulary, and moved that H. H. Rusby be appointed to assist in correcting the therapeutics and doses of the Epitome, which was unanimously adopted.

H. M. Whitney presented the following resolution, which was on motion adopted:

Resolved, That the Committee on Publication be instructed to fix prices of the National Formulary and Epitome, so that buyers of either book in quantity may receive suitable discounts, and that the Committee be given full power to carry this resolution into effect.

C. Lewis Diehl read a report on the social features of the last annual meeting, held at Baltimore, which, on motion of S. A. D. Sheppard, duly seconded, was adopted and ordered to be printed in the 1899 volume of Proceedings, not merely as a Committee report, but with the account of this year's entertainment at the end of the Minutes of the Annual Meeting.

It was moved by S. A. D. Sheppard, and seconded by Chas. Caspari, Jr., that the dues of James O. Burge, of Nashville, Tenn., be remitted, and his name continued on the list of active members. The motion was adopted.

It was moved by S. A. D. Sheppard, seconded by Chas. Caspari, Jr., that the dues of

James B. Colton, of Boston, Geo. A. Crossman, of Raynham, Mass., Paul L. Viallon, of Bayou Goula, La., and John Best, of Central City, Colo., be remitted, and their names placed on the list of life members, old style, without the Proceedings, which was adopted.

On motion of S. A. D. Sheppard, duly seconded, it was agreed that the fixing of a time for reading the report of the Committee on Practical Pharmacy and Dispensing before the Association at large be left to the President and H. P. Hynson, with power to act.

Designs of certificates for honorary and life membership were submitted by Chas. Caspari, Jr., marked respectively Nos. 1, 2 and 3. Action was deferred, so as to give members of the Council more time for careful examination.

The General Secretary called attention to the premature publication, in Merck's Report, of the recommendations agreed upon by the Committee on General Prizes, and submitted the following communication from the editor of the Report:

NEW YORK, *April* 7, 1899.

PROF. CHAS. CASPARI, JR., *General Secretary, American Pharmaceutical Association, 109 Aisquith st., Baltimore, Md.*

Dear Sir: I have your note of yesterday, and regret exceedingly that in publishing our news item on the American Pharmaceutical Association prize papers we anticipated your own action and interfered with the programme of the Association.

Had we had any knowledge of the conditions to which you now draw my attention, we should, most assuredly, have withheld the matter until the proper time. Under the circumstances, I can only offer you my apologies.

It would hardly be fair and just to our representative to give you his name, as it could only bring him into trouble; and I feel positive that he merely intended to do his duty toward the "Report," and am confident that he had no knowledge of the reasons why the publication of the news should have been postponed.

With high esteem I am,

Faithfully yours, THEODORE WEICKER, *Editor.*

On motion of C. Lewis Diehl, duly seconded, the Secretary of the Council was directed to write to the Chairman of the Committee on General Prizes, and ask him to explain how the premature publication of the report of his committee had occurred, at the same time calling his attention to the item in Merck's Report.

Chas. Caspari, Jr., presented the names of the following gentlemen for honorary membership:

E. M. Holmes, F. L. S., of London, England.

David Hooper, F. I. C., F. C. S., of Calcutta, India.

Prof. Dr. Ernst Schmidt, of Marburg, Germany.

On motion of C. Lewis Diehl, duly seconded, the names proposed were recommended to the Association for approval.

On motion of H. M. Whitney, J. P. Remington was requested to present to the Council at a future session some suitable resolutions relative to Dr. E. R. Squibb's services to pharmacy.

S. A. D. Sheppard moved that the Council hold daily sessions at 9 o'clock a. m. Agreed to.

On motion of Geo. W. Kennedy, Council adjourned to meet again at 2:30 this afternoon. GEO. W. KENNEDY, *Secretary.*

THIRD SESSION OF THE COUNCIL—SEPTEMBER 4, 1899.

The meeting of Council was called to order at 2:30 o'clock p. m. by Chairman Thompson, the following members being present: Miss Wanous, Messrs. Caspari, Diehl, Dohme Sheppard, Rusby, Main, Good, Hopp, Lyons, Whitney, Remington and Kennedy

On motion of S. A. D. Sheppard, the reading of the minutes of the morning session was dispensed with.

The Secretary of the Committee on Membership presented the names of 29 applicants, which, on motion, were ordered to take the usual course.

The Secretary of the Council presented the following items of business, which had been submitted to Council since the last annual meeting and disposed of by correspondence.

POTTSVILLE, PA., *September* 26, 1898.

Dear Sir: WHEREAS, The Council did authorize that fifty gold badges be made, as well as forty-five gold bars for the Baltimore meeting and a number of extra bars (22) for the past meetings, the total cost of which amounts to $135.20, all of which was subsequently approved by the Association; and

Whereas, The total appropriation for badges and bars for the current year amounts to but $30.00;

Therefore, It is moved by Chas. Caspari, Jr., seconded by S. A. D. Sheppard, that a further appropriation of $110.20 be made to cover the expenses incurred as above stated.

Please send your vote to the undersigned.

Yours truly, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Good, Hopp, Ingalls, Jacobs, Kennedy, Lyons, Main, Mayo, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—20.

Nays—0.

Not voting—Frost—1.

The motion was adopted.

POTTSVILLE, PA., *October* 7, 1898.

Dear Sir: Charles E. Dohme offers the following motion, which is seconded by W. S. Thompson, that our delegates to the meeting of the National Wholesale Druggists' Association at St. Louis, Mo., be also authorized to represent us at the Convention of retail druggists to be held at the same time and place.

Please send your vote to the undersigned.

GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Ingalls, Kennedy, Lyons, Main, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—19.

Nays—Jacobs—1.

Conditional—Mayo—1.

The motion, having received a majority of all the votes cast, was adopted.

POTTSVILLE, PA., *October* 17, 1898.

Dear Sir: It is moved by H. M. Whitney and seconded by S. A. D. Sheppard, that the Committee on Membership be authorized to print and issue circulars seeking to increase membership, and that an extra appropriation of fifty dollars be made to cover the expense of same. Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Ingalls, Jacobs, Kennedy, Main, Mayo, Rapelye, Rusby, Sheppard, Thompson, Wanous and Whitney—18.

Nays—0.

Not voting—Lyons, Payne, Remington—3.

The motion was adopted.

POTTSVILLE, PA., *January* 11, 1899.

Dear Sir : The report of Annual Proceedings for 1898 being nearly 50 per cent. larger than that for 1897, the appropriation made for the same by the Finance Committee ($2,500) will not suffice to cover the whole expense of publishing and delivering the book, and it is therefore moved by Chas. Caspari, Jr., seconded by S. A. D. Sheppard, that a further sum of $300 be appropriated to meet any deficiency arising in connection with the Proceedings for the present year. The sum of $500 placed at the disposal of the General Secretary for the purpose of securing aid in proof reading, clerical work, etc., with the view of hastening the early issue of the Proceedings, is not available for expenses of publication and delivery. Please send your vote to the undersigned,

Yours respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Jacobs, Kennedy, Lyons, Main, Mayo, Payne, Rusby, Sheppard, Thompson, Wanous, Whitney—18.

Nays—0.

Not voting—Rapelye, Remington—2.

The motion was adopted.

POTTSVILLE, PA., *January 30, 1899.*

Dear Sir: It has been the custom to publish in the Proceedings each year an account of the entertainment given by the resident members to their guests. This year we do not find such an account given in the Proceedings, and the natural inference is that because our General Secretary, who is also Chairman of the Committee on Publication, is a resident of Baltimore and was one of our hosts, his modesty prevented an account being printed of the delightful hospitality of the Baltimoreans.

But as it is very desirable that our records shall preserve such an account, therefore it is moved by S. A. D. Sheppard and seconded by George W. Kennedy that C. Lewis Diehl, Henry H. Rusby and Caswell A. Mayo, all members of the Publication Committee, and non-residents of Baltimore, present at the meeting, be a special committee to present to the Council an account of the entertainment at the Baltimore meeting, and that the same shall be printed in the Proceedings for 1899.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Dohme, Frost, Good, Hopp, Jacobs, Kennedy, Main, Mayo, Payne, Rapelye, Rusby, Sheppard, Thompson, Wanous, Whitney—16.

Nays—0.

Not Voting—Caspari, Diehl, Lyons, Remington—4.

The motion was adopted.

POTTSVILLE, PA., *February 8, 1899.*

Dear Sir: It appearing that the motion of January 5, 1899, appropriating funds to cover a deficiency in the expenses of publishing the Proceedings of 1898, was, by clerical error, made to read $300, when $500 was intended, it is now moved by W. S. Thompson and seconded by George W. Kennedy to amend the said motion by striking out $300 and inserting $500 in lieu thereof, thus making the sum appropriated $500.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Jacobs, Kennedy, Main, Mayo, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—19.

Nays—0.

Not Voting—Lyons.

The motion was adopted.

POTTSVILLE, PA., *May* 13, 1899.

Dear Sir: Enclosed please find draft of program for our next meeting, to be held at Put-in-Bay, Ohio, from September 4th to 9th inclusive, as submitted by Charles Caspari, Jr., General Secretary, Lewis C. Hopp, Local Secretary, and George W. Kennedy, Secretary of the Council, in accordance with action of Council at the Forty-fifth Annual Meeting, approved by the Association at the first general session held at Lake Minnetonka, on August 24th, 1897.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of the Council.*

PROGRAM FOR THE FORTY-SEVENTH ANNUAL MEETING.

Monday, September 4th.	Council Meeting	10 a. m.
	First, General Session.	3 p. m.
Tuesday, September 5th.	Second General Session	10 a. m.
	Meeting Commercial Section	3 p. m.
	Meeting Commercial Section	8 p. m.
Wednesday, September 6th.	Meeting Scientific Section	10 a. m.
	Meeting Scientific Section	3 p. m.
	Meeting Scientific Section	8 p. m.
Thursday, September 7th.	Local Entertainments.	
Friday, September 8th.	Meeting of Educational and Legislative Section	10 a. m.
	Meeting of Educational and Legislative Section	3 p. m.
	Meeting of Educational and Legislative Section	8 p. m.
Saturday, September 9th.	Final General Session	10 a. m.

Yeas—Caspari, Diehl, Dohme, Frost, Good, Hopp, Jacobs, Kennedy, Lyons, Main, Mayo, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—19.

Nays—0.

Conditional—Beal—1.

The motion, having received a majority of affirmative votes, was adopted.

POTTSVILLE, PA., *July* 1, 1899.

Dear Sir: It is moved by W. S. Thompson, and seconded by George W. Kennedy, that the General Secretary be instructed to have made twenty-five (25) gold badges of the Association, same as heretofore, and also forty (40) gold bars, for the approaching meeting at Put-in-Bay, Ohio.

Please send your vote to the undersigded.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Jacobs, Kennedy, Main, Mayo, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—19.

Nays—0.

Not voting—Lyons—1.

The motion was adopted.

POTTSVILLE, PA., *August* 1, 1899.

Dear Sir: In compliance with General Rules of Finance (13th), the Finance Committee submit the following list of expenditures aggregating $7,025 for the fiscal year ending June 30, 1900:

Proceedings	$3000 00
Stenographer	150 00
Journals for Reporter on Progress of Pharmacy	50 00
Salaries	2550 00
Premium on Treasurer's bond	25 00

Traveling expenses	$200 00
Section on Scientific Papers	50 00
Section on Education and Legislation	50 00
Section on Commercial Interests	25 00
Committee on Transportation	25 00
Committee on Membership	25 00
Printing and Stationery	450 00
Insurance	20 00
Badges	80 00
General prizes	200 00
Miscellaneous expenses	125 00

Approved by Finance Committee.

JOSEPH P. REMINGTON, *Chairman.*

Geo. W. Kennedy moves the adoption of the above, seconded by W. S. Thompson.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Beal, Caspari, Diehl, Dohme, Frost, Good, Hopp, Kennedy, Lyons, Main, Mayo, Payne, Rapelye, Remington, Rusby, Sheppard, Thompson, Wanous, Whitney—19.

Nays—0.

Not voting—Jacobs—1.

The motion was adopted.

Geo. W. Kennedy read the report of the Committee on Membership, which upon motion was approved and referred to the Association at large.

H. H. Rusby moved that on account of the absence of Prof. Scoville, Oscar Oldberg be made a member of the Committee on Scientific Papers for the purpose of approving papers at this meeting, which was seconded and agreed to.

On motion, Council adjourned.

GEO. W. KENNEDY, *Secretary.*

FOURTH SESSION OF THE COUNCIL—SEPTEMBER 5, 1899.

Council met at the Hotel Victory, Put-in-Bay, at 9 o'clock a. m., the following members being present: Miss Wanous, Messrs. Beal, Caspari, Diehl, Dohme, Good, Lyons, Mayo, Rapelye, Sheppard, Remington, Whitney, Hopp, Kennedy, Main and Chairman Thompson, who presided.

The minutes of the previous session were read and approved.

The Secretary of the Committee on Membership presented the names of 3 applicants for membership, which, on motion, were directed to take the usual course.

J. P. Remington moved that the design for honorary and life membership certificates marked No. 1, be adopted.

Thos. F. Main moved to amend the motion by striking out No. 1 and inserting in place thereof No. 2, which amendment was lost and the original motion then adopted.

J. P. Remington moved that the certificates for honorary and life membership be signed only by the President and General Secretary of the Association, which was agreed to.

J. H. Beal, chairman, read the following report of the Auditing Committee, which on motion of T. F. Main, duly seconded, was accepted.

REPORT OF AUDITING COMMITTEE.

To the Chairman of the Council of the American Pharmaceutical Association:

Sir: The undersigned committee appointed to audit the books of the Treasurer, General Secretary and Chairman of the Council, report that they have examined and com-

pared the books, accounts and vouchers of the said several officers, that they have compared and checked all items of receipt and expenditure, have examined and counted the bonds and certificates representing the invested funds of the Association, and have also examined and balanced the bank books attesting the moneys on deposit subject to check.

We further report that the books and accounts of the said several officers have been carefully and accurately kept and are in accordance with each other, that all disbursements have been made in accordance with the rules of the Association, and are attested by properly executed vouchers, and that we find the invested and deposited funds to correspond with the amounts of such funds as shown by the records and proceedings of this Association.

Respectfully submitted,

J. H. Beal,
Geo. W. Voss,
G. L. Hechler.

Cleveland, Ohio, *July 29, 1899.*

On motion of J. P. Remington, the General Secretary was authorized to have 200 certificates for life membership and 25 for honorary membership engraved on parchment, and a sum of money not exceeding $300.00 appropriated for this purpose.

J. P. Remington moved that Mr. F. E. Holliday, of Topeka, Kan., Chairman of the Executive Committee of the National Association of Retail Druggists, be invited to address the Commercial Section at this meeting, which was adopted.

On motion, Council adjourned.

Geo. W. Kennedy, *Secretary.*

The President: Gentlemen, you have heard the minutes of the Council read. Is there any suggestion or objection from anybody? If not, they will stand approved.

On motion of Dr. Payne, the minutes were approved as read.

The Secretary of the Council presented three additional names proposed for membership, which were ordered posted for inspection.

The Chair called for the report of the Nominating Committee, and Mr. Thompson, Chairman, read the report as below:

REPORT OF THE NOMINATING COMMITTEE.

The Committee on Nominations, through its Chairman, beg leave to report that after mature deliberation they have decided to present the following named candidates for election as officers and members of Council for the ensuing year:

President—Albert B. Prescott, of Ann Arbor, Mich.

First Vice President—Lewis C. Hopp, of Cleveland, Ohio.

Second Vice President—Wm. L. Dewoody, of Pine Bluff, Ark.

Third Vice President—Henry Gray, of Montreal, Can.

Treasurer—Sam'l A. D. Sheppard, of Boston, Mass.

General Secretary—Chas. Caspari, Jr., of Baltimore, Md.

Reporter on the Progress of Pharmacy—C. Lewis Diehl, of Louisville, Ky.

Members of Council—Chas. E. Dohme, of Baltimore, Md., Leo Eliel, of South Bend, Ind., H. M. Whelpley, of St. Louis, Mo.

Henry M. Whelpley, *Secretary.*

Wm. S. Thompson, *Chairman.*

There being no other nominations for the various offices, the Chair appointed Messrs. M. B. Wood, of Rhode Island, and F. S. Hereth, of Chicago, as tellers to take the vote for President.

Mr. Caspari moved to receive as members the three gentlemen whose names had just been proposed, so that they might have an opportunity to vote for officers. Carried.

Mr. Good moved that while the tellers were taking the vote for President and counting the ballots the Convention proceed to the election of the other officers, which motion was seconded by Mr. Hallberg and carried.

Mr. Good then moved that the Secretary of the Council be directed to cast an affirmative ballot electing as officers of the Association the other gentlemen named by the Committee for the offices other than that of President. Carried.

The Chair announced that as the result of the ballot for President, Prof. A. B. Prescott, of Michigan, had received 55 votes, and declared Prof. Prescott to be duly elected President of this Association. (Applause.)

Mr. Kennedy, Secretary of the Council, stated that, in compliance with instructions, he had cast an affirmative ballot electing the remaining nominees to office, as follows:

First Vice President—Lewis C. Hopp, Cleveland, Ohio.

Second Vice President—W. L. Dewoody, Pine Bluff, Ark.

Third Vice President—H. R. Gray, Montreal, Canada.

Treasurer—S. A. D. Sheppard, Boston, Mass.

General Secretary—Charles Caspari, Jr., Baltimore, Md.

Reporter on Progress of Pharmacy—C. Lewis Diehl, Louisville, Ky.

Council—C. E. Dohme, Baltimore, Md.; H. M. Whelpley, St. Louis, Mo.; Leo Eliel, South Bend, Ind.

The chair announced that the reading of the reports of the various Standing and Special Committees was now in order, and the Secretary called for the Report of the Committee on Transportation. Mr. Ebert, chairman, said he was not yet ready to make the report, but would do so at the final general session.

The Secretary called for the report of the Committee on Revision of the United States Pharmacopœia. Mr. Eliel, chairman, read the report by sub-head titles only, and upon motion of Mr. Mayo, seconded by Mr. Remington, the paper was referred to the Scientific Section for discussion and action.

THE PRESIDENT: It is suggested that we now hear the report of the Committee on Time and Place of Next Meeting, as we have a good attendance in the hall.

Mr. Sheppard, chairman, read the report as follows:

REPORT OF THE COMMITTEE ON TIME AND PLACE OF NEXT MEETING.

The Committee recommend that the meeting of 1900 be held in the city of Richmond, Va., in the month of May, immediately after the meeting of the Convention for Revision of the United States Pharmacopœia in the City of Washington.

S. A. D. SHEPPARD, *Chairman, for the Committee.*

MR. SHEPPARD: I will state for the information of the members that the committee also considered a number of other places besides Richmond for the next annual meeting —San Antonio, Texas, for one, to which place we were cordially invited by a delegate from Texas, who also brought with him an invitation from the city of Dallas, Texas. New York City was also carefully considered, as also the suburbs, as it were, of New York City—the Beaches—Manhattan, Brighton, Asbury Park; and the committee all felt that the time might come, and, in the opinion of the committee, would come, when we would meet at Asbury Park and also in Texas. We all know that, for many years, the question of holding meetings in the farther South—Texas—has been before the Association, very much in the same way that the meeting at Denver was agitated for a number of years before it was brought about. But the committee felt that Richmond had sent us a very cordial invitation for a number of years past, and was entitled to be favorably considered. They had never gotten tired of inviting, and again inviting us, hoping some time we would come there. We have not had a meeting at Richmond for twenty-seven years, and it was considered that as it would not be a distant place from the Pharmacopœia Revision Convention, and a good place to meet for those who wanted to form a party for Europe next year, that would be the best point, under all the circumstances, for the next meeting. These were the main reasons for deciding on Richmond.

MR. MILLER: As the representative and the bearer of the invitation of Virginia, I desire to state that it has been twenty-eight years since this Association met at Richmond. We have been very anxious for you to come, and the year 1900 will be an especially convenient time because a very large number of members of this Association will doubtless attend the Pharmacopœial Convention, and we propose to have the meeting immediately following the Pharmacopœial Convention, which meets at Washington. I hope that the Association will see fit to adopt the report of the committee, and I assure you that we will extend you a most cordial welcome, and will show you that hospitality for which the South is noted.

Mr. Miller's remarks were applauded.

Mr. Good, seconded by Dr. Reed, moved the adoption of the Committee's report.

MR. EBERT: Mr. President, before the vote is put I wish to say that, while individually I approve of the place proposed—Richmond—because I believe it will be an ideal place for the Association to meet, I hold in my hand several telegrams from Texas regarding this matter, and I desire to present them to the Association at this time, so as to form a part of the record of this transaction. They do not request the meeting in 1900, but they wish to have an invitation extended to the Association for 1901, and for that reason I want to read to you two of these telegrams:

DALLAS, TEX., *September* 3, 1899.

A. E. EBERT, *Put-in-Bay, O.*:

Dallas Pharmaceutical Association invites the American Pharmaceutical Association to meet in Texas, nineteen hundred and one.

E. G. EBERLE, *Secretary.*

HEARNE, TEXAS, *September* 3, 1899.

ALBERT E. EBERT, *Put-in-Bay, O.*:

The Texas Pharmaceutical Association extends a most cordial invitation to the American Pharmaceutical Association to meet in Dallas, in nineteen hundred and one.

JAMES A. HASLETT, *President.*

I just wish to present these to the Association for its consideration, and to say, in addition, that in 1902 we have agreed to go to Philadelphia.

MR. FORSTON: I also received a telegram from Dallas, asking for the meeting of 1901 to be held there. But I am here to press a prior claim, that of San Antonio, for 1901. Texas is a very large State. If you want to meet in Dallas in 1901, that is all right, we can accommodate you. Texas has, for many years, had an invitation extended to the American Pharmaceutical Association. We put in our claim several years ago for Dallas, and it was well understood that after a few other points were given a meeting we would go to Texas. Now, gentlemen, the East has had the Association, the West has had it, and the South and Southeast, but the great Southwest never has been honored by your presence; and I am here to-day to invite you to the Alamo City of Texas. I am here to ask the Eastern people to visit Texas and see what we have in that great State. You have all heard of the "Black Land" of Texas. We have there something like 75 miles wide of this black land, running about 300 miles through the center of the State; and this is not a sparsely populated country. We have as densely populated a country in the black land of Texas as perhaps you have in New York State, and if you come to San Antonio next year, or the year after, we will insure you a large attendance from Texas, St. Louis, Kansas City, New Orleans, and from California and the great West. Gentlemen, the life of any association is its members. You have here in this Association perhaps the greatest collection of scientific men in America, but there is one thing I see you lack—you are lacking in membership. Come to Texas then, and we will give you, besides a cordial welcome, a large increase in membership.

MR. ELIFL: I would like to know, for my own information, what the climatic conditions of Richmond are at that time, in May.

MR. MILLER: The finest upon earth. It cannot be surpassed.

The Chair put the motion for adoption of the report as moved by Mr. Good, and it carried unanimously and with applause.

MR. OLDBERG: This is the first time in the history of the Association, I believe, when it has adopted the report of the Committee on Time and Place of Next Meeting without a dissenting voice.

The Chair called for the report of the Treasurer, who read the same, as follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1898, TO JULY 1, 1899.

RECEIPTS.

Cash on hand July 1, 1898	$3,198 01
Received from the sale of 4 Certificates @ $5.00	20 00
Received from the sale of 5 Certificates @ $7.50	37 50
Received from the sale of Proceedings	47 09
Received from the sale of Badges and Bars	127 45
Received from the sale of National Formulary	503 78
Received from Interest on Deposit in New England Trust Company, Boston	53 52
Received from Interest on Money Invested in Bonds (General Fund)	120 00
Received from the Ebert Fund	28 00
Received from Rebate on Journal	1 00

Received from Annual Fees, 1894	$5 00	
Received from Annual Fees, 1895	5 00	
Received from Annual Fees, 1896	250 00	
Received from Annual Fees, 1897	385 00	
Received from Annual Fees, 1898	2,940 00	
Received from Annual Fees, 1899	1,825 00	
		5,410 00
Total		$9,546 35

DISBURSEMENTS.

1898.				
July	7.	Check No. 691. George W. Kennedy, Second half year's salary as Secretary of Council, 1897–1898	$25 00	
		Second half year's salary as Secretary of Committee on Membership, 1897–1898	75 00	
				100 00
	7.	Check No. 692. S. A. D. Sheppard. Second half year's salary as Treasurer, 1897–1898		375 00
	7.	Check No. 693. Charles Caspari, Jr., second half year's salary as General Secretary, 1897–1898		375 00
August	16.	Check No. 694. John S. Bridges & Co., Printing and Stationery		31 70
	16.	Check No. 695. Wickersham Printing Company, National Formulary		44 66
	18.	Check No. 696. F. W. Barry, Beale & Co., Printing and Stationery		45 35
	19.	Check No. 697. Caswell A. Mayo, Committee on Transportation		11 00
September	19.	Check No. 698. H. M. Whelpley, Committee on Membership		4 00
		Check No. 699. Not used.		
		Check No. 700. Not used.		
	19.	Check No. 701. James H. Beal, Section on Education and Legislation		16 07
	19.	Check No. 702. C. S. N. Hallberg, Section on Education and Legislation		13 07
	20.	Check No. 703. V. Coblentz, Ebert Prize		28 00
	20.	Check No. 704. J. W. T. Knox and A. B. Prescott, First General Prize		75 00
	20.	Check No. 705. A. R. L. Dohme and H. Engelhardt, Second General Prize		50 00
	20.	Check No. 706. Henry Kraemer, Third General Prize		25 00
	20.	Check No. 707. Evening Chronicle, Printing and Stationery.		6 25
	20.	Check No. 708. Wickersham Printing Company, Miscellaneous		17 90
	20.	Check No. 709. Caswell A. Mayo, Committee on Transportation.		8 77
		Check No. 710. Not used.		
October	5.	Check No. 711. J. G. McLean, Services as Stenographer		125 00

October	5.	Check No. 712. Germania Publishing Company, Section on Scientific Papers		$2 25
	5.	Check No. 713. S. A. D. Sheppard, Traveling Expenses		34 38
	5.	Check No. 714. George F. Payne, Special Committee on Status of Pharmacists in the Army and Navy of the United States		53 19
	5.	Check No. 715. James H. Beal, Section on Education and Legislation		1 50
	10.	Check No. 716. Wickersham Printing Company,		
		Proceedings	$30 28	
		National Formulary	6 36	
				36 64
	20.	Check No. 717. Henry Briele, Badges and Bars		36 40
	20.	Check No. 718. St. Louis Engraving Company, Badges and Bars		87 50
	20.	Check No. 719. Henry Briele, Badges and Bars		11 20
November	1.	Check No. 720. American Security and Trust Company, Miscellaneous		5 00
	1.	Check No. 721. C. Lewis Diehl, Second half year's Salary as Reporter on Progress on Pharmacy, 1897–1898		375 00
	4.	Check No. 722. Wickersham Printing Company, National Formulary		71 77
	4.	Check No. 723. Alpha Photo Engraving Company, Proceedings		53 40
	12.	Check No. 724. John S. Bridges & Co., Printing and Stationery	$6 85	
		Section on Education and Legislation	4 95	
		Section on Scientific Papers	3 35	
		Section on Commercial Interests	4 40	
		Committee on Transportation	4 33	
				23 88
	12.	Check No. 725. Charles Caspari, Jr., National Formulary	$2 37	
		Proceedings	23 61	
		Miscellaneous	22 25	
				$48 23
	18.	Check No. 726. Alpha Photo. Engraving Company, Proceedings		2 50
December	7.	Check No. 727. John S. Bridges & Co., Printing and Stationery		20 00
	7.	Check No. 728. Evening Chronicle, Printing and Stationery	$25 75	
		Committee on Membership	11 50	
				$37 25
	9.	Check No. 729. S. A. D. Sheppard & Co., Printing and Stationery	$7 70	
		Section on Education and Legislation	3 95	
		Miscellaneous	4 80	
				$16 49
	9.	Check No. 730. John S. Bridges & Co., Printing and Stationery		17 00
January	9.	Check No. 731. Daniel Base, Proceedings		50 00

January	9.	Check No. 732. Wickersham Printing Company, Proceedings		$2218 19
	9.	Check No. 733. George W. Kennedy, First half year's salary as Secretary of Council, 1898–1899	$75 00	
		First half year's salary as Secretary of Committee on Membership, 1898–1899	75 00	
				$150 00
	9.	Check No. 734. C. Lewis Diehl, First half year's salary as Reporter on the Progress of Pharmacy, 1898–1899		375 00
	9.	Check No. 735. S. A. D. Sheppard, First half year's salary as Treasurer, 1898–1899		375 00
	9.	Check No. 736. Chas. Caspari, Jr., First half year's salary as General Secretary, 1898–1899		375 00
	28.	Check No. 737. Wickersham Printing Company, Proceedings		290 90
	28.	Check No. 738. Chas. Caspari, Jr., National Formulary	$1 30	
		Proceedings	13 07	
		Insurance	10 00	
		Journals	44 46	
		Printing and Stationery	4 73	
		Miscellaneous	11 79	
				85 35
February	3.	Check No. 739. Wickersham Printing Company, Proceedings		312 92
	3.	Check No. 740. Wickersham Printing Company, Proceedings	$13 61	
		National Formulary	40 94	
				54 55
	23.	Check No. 741. John S. Bridges & Co., Committee on Practical Pharmacy and Dispensing		6 00
	23.	Check No. 742. Allen & Co., Printing and Stationery		18 00
March	7.	Check No. 743. American Surety Company, Premium on Treasurer's Bond		25 00
	7.	Check No. 744. F. E. Stewart, Miscellaneous		8 50
	11.	Check No. 745. Evening Chronicle, Committee on Membership		11 00
	11.	Check No. 746. John S. Bridges & Co. Special Committee on Status of Pharmacists in the Army and Navy of the United States		6 34
	27.	Check No. 747. Allen & Co., Printing and Stationery		44 50
April	3.	Check No. 748. George W. Kennedy, Committee on Membership		8 00
May	1.	Check No. 749. Wickersham Printing Company. National Formulary		11 58
	12.	Check 750. John S. Bridges & Co., Printing and Stationery		3 00
	20.	Check 751. Geo. F. Payne, Special Committee on Status of Pharmacists in Army and Navy of the United States		51 50
	25.	Check 752. Wickersham Printing Company, National Formulary		22 00
	25.	Check 753. Henry P. Hynson, Committee on Practical Pharmacy and Dispensing		21 25

May	25.	Check 754. John S. Bridges & Co., Committee on Practical Pharmacy and Dispensing		$22 75
June	19.	Check 755. Wickersham Printing Company, Proceedings	$5 00	
		Insurance	5 50	
				10 50
	19.	Check 756. John S. Bridges & Co., Printing and Stationery		13 25
	27.	Check 757. Wickersham Printing Company, National Formulary	$10 14	
		Proceedings	31 68	
				41 82
				$6,897 25

SUMMARY OF DISBURSEMENTS.

Proceedings	$3,045 16
Stenographer	125 00
Journals for the Reporter on the Progress of Pharmacy	44 46
Salaries, Second Half of the Year, 1897 to 1898	1,225 00
Salaries, First Half of the Year 1898 to 1899	1,275 00
Premium on Treasurer's Bond	25 00
Traveling Expenses	34 38
Section on Scientific Papers	5 60
Section on Education and Legislation	39 54
Section on Commercial Interests	4 40
Committee on Membership	34 50
Committee on Transportation	24 10
Special Committee on the Status of Pharmacists in the Army and Navy of the United States	111 03
Special Committee on Practical Pharmacy and Dispensing	50 00
Printing and Stationery	244 08
Insurance	15 50
Badges	135 10
General Prizes	150 00
Ebert Prize	28 00
Miscellaneous Expenses	70 28
National Formulary	211 12
Total Amount of Disbursements	6,897 25
Cash on hand, July 1, 1899	2,649 10
Total	$9,546 35

APPROPRIATIONS AND EXPENDITURES UNDER SAME FOR THE FISCAL YEAR, JULY 1, 1898, TO JULY 1, 1890.

	Appropriation.	Expenditure.
Proceedings	$3000 00	$2985 66
Proceedings special appropriation for expediting issue of 1898 volume	500 00	59 50
Stenographer	125 00	125 00
Journals for Reporter on Progress of Pharmacy	50 00	44 46
Salaries	2500 00	2500 00
Premium on Treasurer's bond	25 00	25 00

	Appropriation.	Expenditure.
Traveling expenses	$125 00	$34 38
Section on Scientific Papers	50 00	5 60
Section on Edncation and Legislation	75 00	39 54
Section on Commercial Interests	25 00	4 40
Committtee on Transportation	25 00	24 10
Committee on Membership	75 00	34 50
Special Research Committee of Scientific Section	51 82	
Special Commitee on the Status of Pharmacists in the Army and Navy of the United States	150 00	111 03
Committee on Practical Pharmacy and Dispensing	50 00	50 00
Printing and Stationery	400 00	244 08
Insurance	20 00	15 50
Badges	140 00	135 10
General prizes	150 00	150 00
Miscellaneous expenses	125 00	70 28
Unexpended balance		1003 69
	$7661 82	$7661 82

PROSPECTIVE ASSETS.

There is now outstanding on the books of the Association—

Annual dues for 1898	$865 00
Annual dues for 1899	3605 00
	$4470 00

The above amount does not include what is due from members whose names will probably be dropped from the roll at the next annual meeting, nor from members whose residence is unknown.

Respectfully submitted, SAMUEL A. D. SHEPPARD, *Treasurer.*

Boston, Massachusetts, July 1, 1899.

CLEVELAND, O., *August* 4, 1899.

The undersigned committee having examined and compared the accounts and vouchers of the Treasurer for the year 1898–99, report that they find the same correct, and that the funds of the Association in the hands of the Treasurer have been properly accounted for.

J. H. BEAL,
G. L. HECHLER,
GEO. W. VOSS.

Mr. Main, seconded by Dr. Reed, moved that the report be accepted and take the usual course. Carried.

Upon call of the Chair, the Secretary read his report as follows:

REPORT OF FINANCIAL ACCOUNTS IN THE CARE OF THE GENERAL SECRETARY.

A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF NATIONAL FORMULARY, FROM JULY 1, 1898 TO JUNE 30, 1899.

I. Receipts.

From Sales and Payment of Bills due July 1, 1898	$503 78

II. Expenses.

Paper and Press Work (printing 1000 copies)	$71 77	
Binding 856 copies in cloth, @ 11 cts	94 16	

Binding 55 copies in sheep, @ 23 cts	$12 65	
Binding 26 copies in cloth, interleaved, @ 18 cts	4 68	
Expressage	24 19	
Postage	3 67	
		$211 12

III. Remittances.

To Treasurer, as per Treasurer's receipts	503 78

IV. Sales.

To dealers and individuals, as per ledger accounts	530 13

V. Accounts Unpaid.

By dealers	74 93

VI. Bills Due by the Association.

All bills due to date have been paid.

VII. Stock on Hand.

Copies in flat sheets (unbound)	469	
Copies bound in cloth	147	
Copies bound in cloth, interleaved	17	
Copies bound in sheep	31	
Copies bound in sheep, interleaved	10	
		674

B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF NATIONAL FORMULARY SINCE 1888.

Receipts to June 30, 1898 (see Proc., Vol. 46, p. 41)	$10,678 73	
Receipts from July 1, 1898, to June 30, 1899	503 78	
		$11,182 51
Expenses to June 30, 1898 (see Proc., Vol. 46, p. 41)	$6,336 63	
Expenses from July 1, 1898 to June 30, 1899	211 12	
		$6,547 75

C. SALE OF PROCEEDINGS.

From July 1, 1898, to June 30, 1899	$47 09	
Remitted to Treasurer, as per Treasurer's receipts		47 09

D. ACCOUNT OF BADGES AND BARS.

	Badges.	Bars.
July 1, 1898. On hand, as per Secretary's report	0	85
Aug. 29, 1898. Received from Dr. H. M. Whelpley	50	
Received from H. Briele, manufacturer		68
	50	153

Badges sold from July 1, 1898, to June 30, 1899, 34 @ $2.00	$68 00	
Bars sold from July 1, 1898, to June 30, 1899, 63 @ 75 cts	47 25	
Bars sold from July 1, 1898, to June 30, 1899, 17 @ 60 cts	10 20	
Bars sold from July 1, 1898, to June 30, 1899, 4 @ 50 cts	2 00	
		$127 45
Remitted to Treasurer, as per Treasurer's receipts		127 45
Balance on hand June 30, 1899, Badges		16
Bars		69
Total Receipts from Sale of Badges and Bars to June 30, 1898 (see Proc., Vol. 46, p. 42)	$586 00	

Receipts from Sale of Badges and Bars from July 1, 1898, to June 30, 1899	$127 45	
		$713 45
Total cost of Badges and Bars to June 30, 1898, (see Proc., Vol. 46, p. 42)	$545 00	
Cost of 50 Gold Badges, Aug. 29, 1898	87 50	
Cost of 68 Gold Bars, Aug. 29, 1898	47 60	
		$680 10

CHAS. CASPARI, JR., *General Secretary.*

Baltimore, July 1, 1899.

Mr. Kennedy moved to receive the report and refer to the Publication Committee. Carried.

The Chair called for the report of the Committee on Membership. Mr Kennedy read the report as follows:

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association.

Gentlemen: It is with a feeling of great pleasure and affectionate gratitude that I am enabled to present to you this my twenty-fifth annual report in compliance with the requirements of the by-laws of our Association. As usual, immediately after adjournment of the forty-sixth annual meeting held at Baltimore, Md., last year, your Secretary gave the duties of his office prompt attention by mailing the customary invitation to each applicant who was accepted and invited by the Association to complete his membership by signing the regular blank form of Completion of Membership which was mailed at the same time. Eighty-seven gentlemen were proposed at our last meeting as proper persons to become members of our Association, and of this number, it gives me great pleasure to report eighty-five, or ninety-seven per cent. of those recommended and invited to complete their membership have complied with the request, and their names have been placed on the roll of members. Whilst the number of those proposed at the last meeting is not the largest during the occupancy of my present position, yet the percentage surpasses that of any previous year, thus demonstrating that my repeated requests in former reports concerning the promiscuous manner in which the names of persons were presented for membership have been seriously considered and wisely acted upon. This would indicate that the members are more careful as to the class of pharmacists they propose, by securing that element who will not only take a deep interest in the Association's welfare but by their very names add prestige to our organization, thereby causing it to be more appreciated, not only by the medical and pharmaceutical professions, but by the community in general. The new members are credited to twenty-three States, District of Columbia and Canada.

At the suggestion of the Chairman of the Committee, Mr. Henry M. Whitney, the same being agreed to by your Secretary, a large number of the following circulars with blank applications for membership were mailed by your Secretary to all the Colleges of Pharmacy, to the Alumni Associations thereof, to the President, Secretary and Local Secretary of all the State and National Pharmaceutical Associations, and also to the Auxiliary Committee on Membership, the authorized agents in the several States and to the active and prominent members of our Association. A number of letters acknowledging the receipt of them were received which contained very encouraging promises that the parties would use their earnest endeavors to procure new members, and judging from present indications at this writing, the year 1899 will be a most fruitful one in the line of increasing our membership, and will undoubtedly well pay for the expense and labor connected with it.

OFFICE OF THE SECRETARY OF THE COMMITTEE
ON MEMBERSHIP OF THE A. PH. A.

Fellow Officers, Members of the Council, and other Prominent Members of the A. Ph. A.;

Our worthy and active ex-President Whitney is this year Chairman of the Committee on Membership.

He thinks our membership should be not less than 5,000. We agree with him. Mr. Whitney proposes to make a heroic effort in his new position to increase our membership. Let us all help him in this worthy cause. He and Mr. Kennedy are sending out broadcast circulars to stir up the druggists of the country.

Shall we not take hold and give them a lift by a personal effort on the part of every one to bring in not less than three new members each at next year's meeting?

Find application enclosed. Please see that $5.00 accompanies each paper when it shall be handed to Mr. Kennedy.

Yours fraternally,

CHARLES E. DOHME, *President*,
CHARLES CASPARI, JR., *General Secretary*,
S. A. D. SHEPPARD, *Treasurer*.

OFFICE OF THE SECRETARY OF THE COMMITTEE
ON MEMBERSHIP OF THE A. PH. A.
POTTSVILLE, PA, *November* 1, 1898.

Dear Sir: In these days of rapid progress as well as rapid transit, combinations and trusts, it seems wise and a necessity for the pharmacists of the country to become, so far as possible, a united body, strong in numbers, effective in influence and power, prepared and ready to protect and advance our material interests.

The American Pharmaceutical Association, organized in 1852, is to-day the largest and most influential organization in the interest of the pharmacists. Its work in the past has been largely of an educational and scientific character. At its last meeting held in Baltimore, Md., the commercial side was prominently brought to the front. That successful results upon this line may follow, it is of the utmost importance that our membership should be largely increased from the ranks of retail pharmacists, and to you is presented the special duty of presenting this subject to your State Association by reading this and inclosed circular, and in any other way you may deem wise and best.

We enclose a few blank applications for membership, and correspondence from you or any one desiring membership is solicited. A letter to the undersigned or any member of the Committee on Membership will be promptly answered.

Let us all unite, as do other interests, and by concentrated undivided power and influence, demand and secure such recognition as our position and service is entitled to.

The forty-seventh annual meeting will be held at Put-in-Bay, Ohio, September 4th, 1899.

H. M. WHITNEY, *Chairman*,
State House, Boston, Mass.
GEO. W. KENNEDY, *Secretary*,
Pottsville, Pa.

Members of Committee on Membership:
H. M. WHITNEY, *Chairman, Boston*,
WM. A. FROST, *St. Paul, Minn.*,
JOS. JACOBS, *Atlanta, Ga.*,
JOHN INGALLS, *Macon, Ga.*,
LEWIS C. HOPP, *Cleveland, Ohio*,
MISS JOSIE WANOUS, *Minneapolis, Minn.*,
CHAS. A. RAPELYE, *Hartford, Conn.*,
GEO. W. KENNEDY, *Secretary, Pottsville, Pa.*

OFFICE OF THE SECRETARY OF THE
COMMITTEE ON MEMBERSHIP OF THE A. PH. A.
POTTSVILLE, PA., *November* 1, 1898.

To the members of the .....

Dear Sirs:

THE AMERICAN PHARMACEUTICAL ASSOCIATION SENDS TO EACH OF YOU A CORDIAL AND FRATERNAL GREETING.

At the Forty-Sixth Annual Meeting of the Association the undersigned Chairman and Secretary of the Committee on Membership decided to make a special effort in the line of interesting a larger number and increasing the usefulness of the Association.

The Association now numbers 1,500; there should be not less than 5,000 active working members. No association in any way connected with pharmacy, in this or any other country, gives to its members as much as this. The Annual Report of Proceedings, a volume of nearly 1,000 pages and sometimes more, contains matter of research, application, instruction and lucid explanation, of great value and importance to every up-to-date pharmacist, that cannot be obtained elsewhere and which makes the volume so desirable as a library of reference, not to mention its value as a book of study, that no progressive pharmacist can afford to be without it.

Besides this annual volume, mailed free to every member once a year, the meetings of the Association are to each member, his wife or friends who attend, an annual outing, which gives a larger return in general culture, pharmaceutical, social, and general education than can be secured in any other way by twice the amount in cost of time and money. Contact, consultation and consideration of varied or special matter, among and with such specialists, scientists or business men as may be desired, cannot be overestimated. The broadening and social influence, helpful and inspiring, always gives to the tired and over-worked pharmacist a peaceful, joyful rest, and a longer lease of life. It is the largest and most influential organization of its kind in the world.

Article 1, Section 2, of the Constitution, reads: "To encourage such proper relations among druggists, pharmacists, physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage."

Sec. 3. "To improve the science and art of Pharmacy by diffusing scientific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business."

Sec. 5. "To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated druggists and apothecaries."

Sec. 6. "To uphold standards of authority in the education, theory and practice of pharmacy."

Chap. 7, Art. 1. "Every retail druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of pharmacy, chemistry and botany, who may be specially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-Laws, subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears."

Thus it will be seen all of you are entitled to membership, and we have placed in the hands of ..... blank applications for membership. We not only cordially invite, but earnestly urge you to join with those who have, during the

past forty-six years, enjoyed and profited by the work of this body, and you, by increasing the membership, will largely increase its power.

The Forty-seventh Annual Meeting will be held at Put-in-Bay, Ohio, September 4, 1899.

For the Committee, H. M. WHITNEY, *Chairman*,
GEO. W. KENNEDY, *Secretary*.

The Treasurer, S. A. D. Sheppard, reported to your Secretary that there were, on July 1st, 1899, one hundred and twenty-six members liable to be dropped from the roll for the non-payment of dues. This number is quite large, but somewhat smaller than last year, when it was one hundred and fifty-two, or the year before, when it was two hundred and forty-one. This would seem to indicate that the depressed financial condition which for many years has been hanging over our country is gradually disappearing, and therefore, in anticipation that it will continue to improve, let us hope that the subsequent reports will show a much smaller number, if any at all.

Report on Membership.

Active or contributing members in good standing at last report	1,306	
Members elected since last report	85	
Total		1,391

Loss in Membership (active).

By resignation	34	
By transfer of life membership	0	
By death	15	
Dropped from roll for various reasons	112	
Total loss		161
Number on roll at this report		1,230

Life Membership.

Number on roll at last report	103	
Number added since last report	0	
Total	103	

Loss in Life Membershship.

By death	6	
Number on the roll at this report		97

Honorary Membership.

Number on roll at last report	11	
Additions	2	
Total	13	
Loss by death	2	
Number on roll at this report		11

Total Membership.

Active or contributing members	1,230
Life members	97
Honorary members	11
Total	1,338

And now, gentlemen, with your indulgence, as one who has tried faithfully to serve you for a quarter of a century as Chairman of the Executive Committee from 1874 up to the time that Committee was abolished and the Council was organized in 1880, and thereupon elected Secretary of the Council and Secretary of the Committee on Membership, the duties of the latter Committee being almost identical with those of the Executive Committee, and as one who has always manifested a deep interest in the welfare of the Association from the time of his election to membership at the meeting held at Chicago, Ill., in 1869, both in the performance of his duties and attendance on its meetings, not having missed one meeting since 1871, it behooves me, on occasions like this, to say a few words regarding our membership, and to give you a few statistics concerning the same. It is a source of great pleasure to me as I recount the years to that meeting held at Louisville, Ky., in 1874, where I was first elected an officer of our Association, and each subsequent year up to the present time, to behold the faces of these old disciples of pharmacy, whose real desires are not only to gratify themselves with the knowledge and pleasure that being a member of our Association affords, but also to share that knowledge and pleasure with all other good pharmacists by inviting them to become members of our Association. As a result of the frequent circulars sent out explaining the advantages and objects of uniting themselves with our organization, twenty-seven hundred and ten followers of our profession have become members of our Society, representiug not only the United States, but also foreign countries and various islands dispersed throughout the great seas, wherein American ingenuity has seen fit to penetrate, thus giving unto the organization world-wide fame and reputation. But, as is the case in every society, through lack of interest in their profession or undertaking, through lack of funds, or through lack of energy and determination, and, in many cases, I dare say, through forgetfulness pure and simple, many have been dropped from the roll, and of this class of persons we find twelve hundred and three. While the loss has not been keenly felt, yet it would have been more gratifying to your Secretary could he have reported the contrary. But then again there were some who came to the conclusion that other avocations in life awaited them, while others after many years of labor in shop or study, for other good and sufficient reasons have deemed it impossible to give the organization the proper interest that is due from every member, have adopted the more honorable method of severing their connection by handing in their resignation; and of this number we find six hundred and forty-five. Again, but the most honorable of all, death has visited our ranks and has deprived us of many of our prominent leaders; and, while they but answer to that call to which we all must at some time answer, and while their loss is deeply regretted, we rejoice in the fact that their interest and labors whilst on earth for the welfare of humanity, their profession and our Association, will ever live in the hearts of all of us to be handed down by us to posterity. And of those who have answered the beckoning which none dare resist, we find three hundred and fifty-five. This is but the result of the past quarter century, yet, notwithstanding our great loss in membership, we still have on the roll, including honorary members, thirteen hundred and thirty-two (1332), whilst in 1874 it was only 1034. As we now stand at the threshold of a new century, let us resolve to enter it with the firm persuasion and full determination to make it the grandest and most respected of all other organizations.

During the past year the archers of death have been unusually busy, and with unerring aim have drawn their bows upon our ranks. Many of our associates have fallen by the way. The honors that we confer upon our fellow members bring no immunity from the shafts of the Great Conqueror. He calls the humblest as well as the most prominent with equal certainty and imperativeness, and there is no evading the call. Every summons is but a reminder of the words of the poet:

"Art is long and time is fleeting,
And our hearts, though stout and brave,

Still, like muffled drums, are beating
Funeral marches to the grave."

Upon the mortuary record for the year are found the names of quite a number of the Association's most worthy members, whose departure from our midst has already caused great sorrow and regret among our number; and it may truly be said of them all that to know was to love, honor and admire them; but though they have sunk into that peaceful sleep, never to awake again, they have fulfilled their duty well and have set for us an example by which we may enlarge our observations through their eyes, profit by their experience, and learn from what they have enjoyed and suffered. Among this number are found the names of Charles A. Heinitsh, John Ingalls and Charles A. Tufts, who during their lives served the Association in the capacity of President, the latter gentleman also as Treasurer for a period of twenty-one years. While the loss of these distinguished officers is keenly felt by the Association, yet the all-wise Creator has deemed it fit so to be, and we cannot but submit to the inevitable. The life of each of our deceased members has been one of perseverance, thrift and usefulness, and every member of our Association may learn a valuable lesson by carefully reading over the short synopsis of their lives, so that when we, who each day approach nearer the grave, are called upon to give an account of the deeds done upon earth, it may be well said of us, not only by the great God above, but by those who were our sublunary associates, "Well done, good and faithful servant."

And in conclusion let me suggest that these annual dispensations should remind us not only of our mortality, but of our immortality as well, so that when it is said of anyone of us, "He is no more," it may also be said, "He still lives."

The following is a list of deceased members brought to the knowledge of your Secretary:

William Aird, Jacksonville, Fla.
A. R. Bayley, Cambridge, Mass.
A. L. Calder, Providence, R. I.
C. Christiani, Washington, D. C.
J. B. G. Dejan, New Orleans, La.
Norbert Gille, Brussels, Belgium.
Theo. L. A. Greve, Cincinnati, Ohio.
Charles F. Hartwig, Chicago, Ill.
Chas. A. Heinitsh, Lancaster, Pa.
John Ingalls, Macon, Ga.
John Kochan, Denver, Col.
E. Rudolph Leonhard, Paterson, N. J.
Rush P. Marshall, Monrovia, Cal.
Jason A. Miller, Gloversville, N. Y.
Geo. A. Newman, Brooklyn, N. Y.
D. G. Plummer, Bradford, Ill.
Eugene F. Russell, Baltimore, Md.
F. W. Sennewald, St. Louis, Mo.
Wm. Stahler, Norristown, Pa.
Colin F. Stam, Chestertown, Md.
Charles A. Tufts, Dover, N. H.
A. S. von Waldheim, Vienna, Austria.
John E. Wilson, Walnut Ridge, Ark.
G. A. Zwick, Covington, Ky.

William Aird, of Jacksonville, Fla., died on August 18th, 1899, after a brief illness of less than a week. Deceased was born in Jacksonville in 1856, and resided in his native city all his life. After receiving a good common school education, he began the study of pharmacy by entering one of the best pharmacies in that section of the country, where he displayed great aptness in his studies, and in a short time, owing to his neatness and cleanliness, and being particular with everything he undertook to do, it was soon acknowledged by his employer that he had selected a profession to which he was well suited. After serving his apprenticeship with credit, be began business for himself, and was quite successful. He was very much interested in the study of Pharmacy and Chemistry, and devoted all his leisure moments in seeking to increase and improve his knowledge along these lines. Deceased was a kind-hearted man, was very charitable and gave liberally to the poor. He leaves a widow and five children to mourn his loss. Deeeased became a member of our Association in 1887 at the meeting held in Cincinnati, Ohio.

Augustus R. Bayley, of Cambridgeport, Massachusetts, the oldest druggist in that city,

died on the 30th of January, 1899, after a short illness, of the grippe. Mr. Bayley was born in Wentworth, N. H., in 1818, and when a boy went to work for his uncle, A. H. Ramsey, at his drug store in Harvard Square, where he learned the business. For seven years he was in partnership with his uncle, and in 1855 he established his own store in Cambridgeport. His long business career had made for him a large acquaintance, having been in the business for upwards of forty-four years in that city. Mr. Bayley was a member of the New England Genealogical Society, in which society he always manifested a deep interest. Deceased was beloved and highly respected by all whom he became acquainted with. He was a genial man, with a great fund of good humor, and, judging from his sprightly steps at four-score years, and his remarkable faculty of finding the bright side of everything, life was made sweeter and longer to him. Up to within a few years of his death, he was kept actively engaged at his duties, devoting his whole time to the management of his store. Mr. Bayley was married, and leaves a wife and daughter to mourn his loss. He was a life-member of our Association, and his membership dates from 1859, at the meeting held in the city of Boston.

Albert L. Calder, one of the most prominent and respected citizens of Providence, R. I., died at his residence, May 24, 1899. Mr. Calder was the son of William Calder, and was born at Providence, September 6, 1825, He received his education in the common schools, and at quite an early age entered the employment of Joseph Balch, and remained as a clerk in the drug store from 1842 to 1848. Leaving the employ of Mr. Balch, he entered that of Seth W. Fowle, a wholesale druggist of Boston, where he worked some time. In 1850 he returned to Providence, at which place he lived up to the time of his decease. In February, 1851, he went into partnership with his brother, George B. Calder, in the drug business, and the two conducted the house until 1853, when their store on Westminster street was burned out. Soon after the fire Mr. Calder secured the lease of a lot on Westminster street. He erected a building and conducted business for more than thirty years, selling out in 1885, when he retired finally from the drug business. Mr. Calder was a man of great activity in many fields, and had held many positions of trust and honor. He was a member of the Rhode Island Board of Pharmacy at the time of its organization, and was its president for fifteen years thereafter. He was a life member of our Association, having joined in 1859 at the meeting held in Boston, Mass. He took an active part in the affairs of his state association, of which he was a member from its organization, and was elected by it a delegate to the Pharmacopœial Convention of 1890.

Charles J. K. Christiani, of Washington, D. C., died suddenly of heart disease at his home on May 26, 1899. Mr. Christiani had been in excellent health until the last few months. He suffered from the grip last fall, and since then for the first time in his life, had suffered from heart trouble. His family did not regard his illness as serious, and he would at times go into his store and prescribe for himself. At seven o'clock in the morning he arose and went down stairs, his home being above the store. He had no sooner desended the stairs than he was seized with a return of the heart trouble, and he was heard to fall. Before any of the members of his family could reach him he was dead. Only a few days before Mr. Christiani wrote in a note-book he carried in his pocket his full name, date of his birth, and other notes concerning himself. At the same time he showed these memoranda to his family and made some humorous remarks about the record. These notes give his birthplace as Hauer, Germany, January 30, 1830. He came to America in 1856 and opened a drug store on 9th street, a short distance above Pennsylvania avenue, and a year later he moved his place of business to 484 Pennsylvania avenue. Twelve years ago he put up the handsome building on that site which he has since occupied as a place of business and residence. He was one of the best known druggists in the city, and amassed a considerable fortune, being regarded as a man of the highest integrity in all his affairs. Deceased was a man of solid attainments and extensive learning. He was a graduate of the University of Bonn. His wife and two chil-

dren survive to mourn their loss. The widow will continue the business for a time. One son, Carl A., is attending the Bethel Military Academy at Warrenton, Va. Joseph, the other son, is a medical student at the University of Pennsylvania. Mr. Christiani became a member of our Asssociation in 1874 at the meeting held at Louisville, Ky.

John B. G. Dejan, of New Orleans, La., died at his home in that city recently. After receiving a good education, at an early age, he began the study of pharmacy, and prosecuted his studies with great thoroughness and skill throughout his entire apprenticeship. Under the watchful eye of a good instructor, he was soon amply fitted to branch out into the world among his fellow associates of the profession, and soon had charge of a large pharmacy. His earnest devotion to business won for him the esteem and confidenee of all persons with whom he had any business transactions, and he soon built up a good and profitable trade. He was highly respected by all his friends and acquaintances, and the news of his death cast a sudden gloom over all. Deceased became a member of our Association at the meeting held in New Orleans in 1891.

Norbert Gille, of Brussels, Belgium, an honorary member of our Association, died at Brussels during the month of February, 1899, aged eighty years. He was an eminent and a very fluent talker, and took a prominent part in the proceedings at the International Congress of Pharmacy in 1885, and will be remembered by all the foreign visitors who took part in the discussion on that occasion. In 1867, he was elected a professor of the Royal Veterinary School, and stood high in the esteem of his fellow associates for the great interest he manifested in his work. Shortly after this he was appointed a member of the Royal Academy of Medicine, and later a member on the Central Jury of Pharmacy. He also served as a member of the Commission of the Revision of the Pharmacopœia, and of the Council of the Royal Society of Pharmacy of Brussels, of which latter, for nearly ten years, he occupied the position of General Secretary with competency and distinction, at all times exhorting his colleagues to fight a good fight in honor of their profession. He was formerly an apothecary, and was highly appreciated for his knowledge of the business and his honest dealing with customers. He was for many consecutive years Vice-President of the Academy of Sciences, and for a long period of time held the honorable and important Professorship of Pharmaceutical Sciences at the University of Brussels. Deceased became a member of our Association at the meeting held in Philadelphia in 1868.

Theodore Lund August Greve was born April 2, 1830, at St. Michaelis Donn, in Holstein, Germany. He was the only child of Joachim Greve and Anna Margaretha Lund. His father was a prominent teacher and writer, publishing a number of standard books on educational subjects, one being of particular importance, a history of the Duchy of Holstein, a standard work which is to be found in the Harvard and other libraries. Mr. Greve received his early education in the schools of the neighborhood, and when the family moved to the popular University city of Kiel, he was enabled to take advantage of the opportunities there presented and obtained a university education. His father was, as has been said, himself a man of learning and scholarship, and a somewhat strict disciplinarian, and the habits of study acquired in his youth and impressed upon the subject of this sketch by the association with his father clung to him throughout life, so that education to him was not ended until the very day of his death. He acquired a knowledge of English in his youth which was so accurate and idiomatic that he used it as freely as he did the mother tongue. He also gained a good knowledge of Latin, Greek, French, Spanish and Italian, and a very thorough grounding in the natural sciences. In 1848, the family moved to America, settling on a farm in the wilds of Southern Illinois. In 1854, Theodore went to Cincinnati and took employment in T. C. Thorp's drug store, on the corner of Court and Plum. About 1858, he left Dr. Thorp,

and was for a long time in charge of the laboratory of W. S. Merrell & Co. Between 1858 and 1860, he studied medicine and received the degree of M. D. from the Eclectic Medical Institute of Cincinnati, with which he held official connection as Vice President until he resigned a year ago on account of feeble health. The summer of 1860 was spent on his father's farm, when he returned to Cincinnati, and in that year purchased the property and drug store on the southeast corner of Sixth and John streets, where he continued in business until the day of his death. For many successive years, Mr. Greve held office in the Cincinnati College of Pharmacy, and always took an active part in our Association, being the author of several interesting papers, which may be found by reference to the Proceedings. For one year he served in the capacity of President of the above-named college. At the last meeting of the Ohio State Pharmaceutical Association, Mr. Greve was elected to honorary membership for services rendered in the interest of pharmaceutical education. Mr. Greve was one of those quiet scientific workers who do not make much stir with the general public, but whose works remain behind long after most of us have passed to the great beyond. He was a man strong in his convictions, and possessed the moral courage to stand by them. Those who have had the pleasure of discourse with him knew him best, and often marveled at the wide range of his knowledge. Deceased leaves a widow and four children to mourn their loss. He was elected a member of our Association at the meeting held at Cincinnati in 1864.

Charles F. Hartwig, of Chicago, Ill., died at his home in that city on August 16th, 1899, from abscess of the lung. Mr. Hartwig was born at Oconomowoc, Wakesha county, Wisconsin, on April 2nd, 1853, and received a good common school education At the age of fourteen, he entered the store of R. Sauerhering at Mayville, Wisconsin at which place he began his apprenticeship to the apothecary business, and, having served his full term of four years, he moved to Milwaukee, Wis., where he entered the store of Weiser & Trott, in whose employ he remained for several years, after which he went to Chicago and clerked for Albert Ebert and J. H. Plautz, and later on went to Philadelphia and matriculated at the Philadelphia College of Pharmacy, from which institution he graduated in 1875. In 1877, he opened a store at the corner of Cornell and Milwaukee avenues, and in 1878 bought the store at the corner of Chicago and Milwaukee avenues from O. Penser, at which place he continued the drug business until June, 1895, when he sold the establishment to Hartwig Brothers. He then became a salesman for Sharp & Dohme for the city of Chicago, which position he held up to the time of his death. Deceased was a man highly respected and honored, and had a large circle of friends. Owing to his close attention to business, and his skilled management in dispensing drugs, he scored a big success in the drug business. He was married to Mary Meyer in 1885, and one child, now deceased, blessed their happy union. He leaves a widow to mourn his death. Mr. Hartwig became a member of our Association in 1881 at the meeting held at Kansas City, Mo.

Charles A. Heinitsh, one of the most widely and favorably known pharmacists throughout the United States, died at his home in Lancaster, Pennsylvania, on December 29th, 1898, after a brief illness of pneumonia. He was a man of more than usual ability, and was not only active in promoting worthy objects of his profession, but also in contributing to the welfare of his many friends and fellow citizens. His genial nature—always in good humor, always with a kind word for every one, always with a broad-minded charity for the limitations of human nature—commanded the respect and won the affection of all who knew him. Mr. Heinitsh came from a family who were probably longer successively engaged in the drug business than any other in the United States, the name having been prominently identified with the drug trade for the past century and a quarter, and it is known in connection with the business throughout the country. For nearly half a century he has been identified as a druggist of Lancaster, the successor of his

father and grandfather, and the store operated by the deceased has been continually owned and controlled by the family since 1782. Carl Heinrich Heinitzsch, grandfather of Charles A., was the first representative of the family to emigrate to this country. He came from Leipzig, Germany, in 1772, and settled in Lancaster. He was a progressive merchant, and in 1782 embarked in the drug business, establishing a reputation for variety and purity of stock which the Heinitsh store has ever maintained. The business was successful, and grew to large proportions. The elder Heinitzsch was succeeded by his son, C. August, and later another son, John F., was admitted to partnership. The latter, who was the father of Charles A., became sole proprietor of the business in 1818, and moved to the building now 32 East King street. In 1841, he moved to the present location. Mr. Heinitsh was born on July 21, 1822, and attended the public schools of the city during his early boyhood. He afterwards went to John Beck's Academy at Lititz, and completed his education at Pennsylvania College, Gettysburg. In 1838, he entered the drug store of his father as clerk, and displayed natural talents for the business. In 1841, he was admitted into the business by his father under the firm name of John F. Heinitsh & Son. His father retired from business in 1849, and the entire management of the store devolved upon his son, who continued as sole proprietor with success up to the time of his death. Mr. Heinitsh's drug store has always been regarded as one of the leading drug stores in Lancaster. The sterling business habits and thorough knowledge of drugs possessed by the deceased made him prominent in his profession. In 1887, the Philadelphia College of Pharmacy conferred the degree of Master of Pharmacy upon him, he being one of the first five in America upon whom this honor was conferred. At the annual meeting of the Alumni Association of the Philadelphia College of Pharmacy held April 12, 1898, he was elected an honorary member. Upon the organization of the Lancaster County Pharmaceutical Association, in which he was a leading spirit, in April, 1882, he was elected President. Mr. Heinitsh was also one of the founders of the Pennsylvania Pharmaceutical Association, which was organized at Harrisburg on February 26, 1878. He was unanimously chosen its President at the annual meeting held in Reading during the same year, and by re-election was also presiding officer of the State body when it met in Pittsburg in 1879. Contrary to the usual rule in such cases, his interest in the Association did not lag after his election to the presidency. He was always in attendance at the annual meetings, and his smiling face was always one of the first to greet the members upon their arrival. At the meeting of the Association held at Buena Vista, on June 24, 1898, he was presented with a beautiful gold medal in honor of his having been connected with the drug business for fifty years. Like his ancestors, Mr. Heinitsh possessed a strong love for natural science and took a great interest in the advancement of the same. He was one of the original movers in the organization of the Linnean Society in 1860, and was the oldest living charter member of the same. For a number of years deceased had been President of the Society, and for two years filled the position of Treasurer. He was also one of the curators of the Linnean and took an active part in all the affairs of the Society. In 1889, he was made a Doctor of Science by the Board of Trustees of Franklin and Marshall College, Mr. Heinitsh was also an active member of the Lancaster County Historical Society, the Pennsylvania German Society, and at one time belonged to the Tucquan Club. He also served several years as a member of the Lancaster School Board. In 1851 he was united in marriage to Maria, daughter of the late Henry R. Reed, of Lancaster, and sister of the late Geo. K. Reed. His wife survives. Four children were born to them, all of whom are dead, as follows: Susan, Bertha, Henry, all of whom died in infancy, and Charles A., who died at the age of sixteen. Three nephews, one of whom is Sigmund W., who was his uncle's assistant in his drug store, and one niece survive. The funeral services were held on Monday, January 2, 1899, at the Trinity Lutheran Church, of Lancaster, and the attendance of the public was large. The remains were borne to Woodward Hill Cemetery. The deceased became a member of

our Association in 1857, and in 1865 was elected Third Vice-President. At the annual meeting held at Niagara in 1882, he was honored with the position of President. Mr. Heinitsh was a life member and by his death the Association loses one of its most ardent and industrious members.

John Ingalls, one of the most prominent and respected druggists in the state of Georgia, died very suddenly at his home in Macon on November 12, 1898. Mr. Ingalls was born at New Berne, N. C., in 1829. After receiving a good foundation by attending the public schools, he was apprenticed to one of the leading pharmacists in that State. Upon attaining his majority, he removed to Charleston, S. C., and later went to Columbia, where he remained as clerk and afterwards proprietor of a large retail store until 1860. He then went to Macon, Ga., and became identified with the business he conducted up to the time of his death. He was a very popular man and possessed an extensive acquaintance. He was a man of unusual moral and physical courage, and was capable of filling any office or employment with integrity, skill and prudence. He was a courtly, polished gentleman of the old school, and had a pleasant word for everybody. As a disciple of his chosen profession, he was industrious, laborious and persevering, always endeavoring to promote its interests and to give to his fellow-pharmacists a deeper realization of the pleasures of the profession, and convincing them that, after all, drug-store life is worth the living. He leaves a widow, but no children. He served one term as President of the Georgia Pharmaceutical Association. Deceased became a member of our Association at the meeting held in Philadelphia in 1876, and has filled many official positions. On September 12, 1877, he was elected second Vice President, and six years later was elected first Vice President of our Association at the meeting held at Niagara Falls, N. Y. On August 26, 1884, he was elected President at the meeting held at Milwaukee, Wis. At the last meeting of the Association, he was elected a member of the Council, in which capacity he served up to the time of his death.

John Kochan, the peerless pharmacist, the tireless student, the gifted scientist and most devoted husband, died at his home in Denver, Colorado, on March 8th, 1899, following that of his wife the evening before. It was in the little village of Graach, a suburb of Berncastel on the River Mosel in Rhenish Prussia that Mr. Kochan began his mortal career. His father, Mathew Kochan, was for forty-nine years instructor in a celebrated institution of learning; his oldest brother was at one timo a tutor in the family of Marshal McMahon, the first President of the present republic of France, and a sister still holds a high position in the household of Princess VonAhrenberg at Brussels. Mr. Kochan left his childhood home at the age of fifteen. He brought as an heritage the innate qualities of a true teacher, and these necessarily include the lesser ones that characterize the industrious student. After coming to this country, he made his home with his brother, Conrad Kochan, then as now a prominent banker at Maysville, Mo. He attended school there for two years and then entered the pharmacy of Ira Brown, who is at present a judge in Gunnison County, Colorado. He then read medicine for a time with Dr. McKinnon, of Marysville, but pharmacy seemed to offer a broader field for labor and study, so early in 1877 he went to St. Louis and took a clerkship in a drug store and attended lectures in the St. Louis College of Pharmacy. The next year he went to Denver and, after working for a time with William Dingle, he secured a position with the firm of J. J. Riethmann & Co., in which position he continued almost uninterruptedly during the life of the concern, a period of eighteen years. Here he was enabled to handle everything in the way of drugs and chemicals and apparatus used throughout the entire section. It would be impossible to gather within the walls of any seat of learning so many and such varied methods of instruction as were afforded by contact with the people who visited the house of Riethmann & Co. twenty years ago. Our embryo teacher and full-fledged student made the most of the opportunity. While the acquisition

of a vast amount of knowledge was almost compulsory under the circumstances, young Kochan was not satisfied in that way. He soon became the teacher of those that taught them. Little by little he produced the material for a laboratory and soon became possessed of a vast library, thus fitting himself for the duties of a teacher that he unconsciously was. When the Denver College of Pharmacy was established, he gladly offered his services gratis. Until the school was abolished three years ago, he continued to be its main prop, and the success achieved, which was always a matter of just pride, was largely due to the zeal and labor of Mr. Kochan. He was one of the organizers of the Natural History Section of the State Historical Society, whose work has attained such a standard that the Legislature appropriated two thousand dollars for the printing and diffusion of its documents. He never sought fame, and realized fully what all educated people know, that there is very little new to be said or written. Mr. Kochan having familiarized himself with the books and writings of others and not being a seeker for fame or lucre, contributed but a small portion of his work to public print. Mr. Kochan's acquaintance with chemistry was broader than that usually attained by pharmaceutical chemists, because of the association with those engaged in the assay and treatment of general bearing earth and ore. Even before the founding of the College of Pharmacy, he had supplied himself with the apparatus and material for a well organized chemical laboratory. In botany he was frequently called upon by the Department at Washington for advice in such matters. Within a radius of one hundred miles of Denver, it is safe to say that about every plant had a close intimacy with him. To accompany him on a Sunday morning in June was not simply a fashionable search for primrose, golden rod and columbine, but it was to meet and know those rare, delicate, hardy and beautiful flowers, who on their stately stems arose in their beauty and fragrance, bidding defiance to the eternal snow. The records at Washington will show Mr. Kochan's work with "loco" weed, that bane of western cattle-men. "Osha," or Rocky Mountain cough root, was first correctly identified and described by Mr. Kochan, and he also made the first proximate chemical analysis of the plant, which he read at the first meeting of the Colorado Pharmaceutical Association in 1890. His proficiency in the use of the microscope made him the bon ami of all local devotees. That Mr. Kochan was of a superior order of mentality, his achievements will amply attest. That he was a genius is evidenced by the rare patience and industry with which he prosecuted every undertaking, and these qualities alone are the essentials of genius. Mr. Kochan united himself with our Association at the meeting held at Detroit, Mich., in 1888.

E. Rudolph Leonhard, of Paterson, N. J., died at Camp Cuba Libre, Jacksonville, Fla., on September 1, 1898, of typhoid fever. The news of the death of Mr. Leonhard was received with genuine sorrow by his classmates of the class of 1886, the members of the Alumni Association of the New York College of Phnrmacy and his numerous friends in the retail and wholesale drug trade, who held him high in their esteem. Mr. Leonhard was of a sunny nature, large-hearted and generous and popular wherever he went. Tall and of athletic build, he presented none of the marks of an apothecary, though no more of an expert dispenser handled the pill tile or the mortar and pestle. He was one of the apothecaries at the Vanderbilt Clinic at Amsterdam avenue and Sixtieth street, having been appointed in 1887, and was the first to dispense medicine at the new institution. He resigned this position, however, and engaged in business for himself, opening up a large pharmacy at Passaic, N. J., in partnership with W. E. Shuit. The firm dissolved partnership at the end of a year, and Mr. Leonhard then entered into business with his father, Theodore Leonhard, who conducts at Hamilton, N. J., one of the most extensive bleaching establishments in the United States. He with his three brothers and father comprised the Paterson Parchment Paper Company. When the President called for volunteers, the father called his sons together and said that at least one should answer the call. Rudolph, being unmarried at the time, enlisted, and was appointed

recruiting sergeant at the camp at Sea Girt, N. J. His death was doubly distressing, owing to the fact that he leaves a bride who married him on the eve of his leaving for the Southern camp. The fact that the marriage took place just before the bridegroom left for the front was enough to lend an air of romance to the affair, and cause the death of Leonhard to touch the heart of every sympathetic person. Deceased became a member of our Association in 1891 at the meeting held in New Orleans, La.

Rush Porter Marshall was born in Princess Anne, Somerset county, Maryland, on December 18th, 1860, and died at his home in Ontario, San Bernardino county, California, on December 10th, 1898, lacking seven days of being thirty-eight years old. At the early age of fifteen, he left the home of his boyhood and proceeded to Philadelphia to take up the study of drugs. Entering a retail store, and beginning at the foot, he quickly worked his way up the ladder of fame and success. He became absorbed in his work, and the more he studied the business, the more he became infatuated with it. He was graduated from the Philadelphia College of Pharmacy with the class of 1880–81, after laying off two years to attain the required age. After becoming a pharmacy graduate, he spent several years in clerking and managing a large retail drug store in Philadelphia, and later started in business for himself in that city at 16th and Race streets, where he built up for himself a large trade. Being always obliging, courteous and polite, he made for himself many warm friends, and was a general favorite with all that knew him. He ranked among Philadelphia's prominent druggists, and carried on a large prescription trade. He was a member of the College of Pharmacy Alumni Association for many years. As his health began to fail, he visited California in the spring of 1895 with a hope of regaining it, and in the following winter returned with his family to make his permanent home amid the sunshine and orange blossoms; but the seeds of consumption were already sown in his constitution, and his health began rapidly to fail. He spent several months at the beautiful San Gabriel Sanitarium, where he secured temporary relief, but the dreadful disease again settling on him, he returned to his home, where he passed peacefully away. He leaves a wife, three children, and a large circle of relations and friends to mourn his loss. His remains were placed in the receiving tomb in Pasadena to await the return of spring, when they will be brought east and placed in their final resting place in the family lot in Ivy Hill Cemetery, Philadelphia. Deceased became a member of our Association in 1893 at the meeting held in Chicago, Ill.

Jason A. Miller, a well-known pharmacist and highly respected citizen of Gloversville, N. Y., died very suddenly on December 8, 1898. Mr. Miller was born in Williamsburg, Mass., and was sixty-three years old at the time of his death. He was a man of good education, and was well adapted to pursue a professional life. He was a graduate of the Medical College at Springfield. After his graduation he devoted considerable of his time in the study of pharmacy until he completely mastered this branch. He engaged in business in Springfield, and successfully conducted a large pharmacy there for a number of years. He then went, in 1866, to Gloverville, where he remained up to the time of his death. Mr. Miller was one of the most enterprising citizens in that community and was connected with several large and important organizations. His manly character and amiable disposition won for him the love and esteem of all with whom he became acquainted, and his sudden death cast a gloom throughout the whole town of which he had for so many years been one of its most enterprising citizens. He was a scholar of more than ordinary ability, and the profession loses in him one of its ablest followers. He leaves a widow but no children to mourn his loss. Deceased united himself with our organization in 1879 at the meeting held at Indianapolis, Ind.

George A. Newman, the oldest apothecary in Brooklyn, N. Y., in point of continuous business, died at his home, corner Clermont and Myrtle avenues, Saturday afternoon, September 3, 1898, in his seventy-seventh year. Mr. Newman was of English birth, but

came to this country when he was but a small boy. After procuring a liberal education in the various schools and colleges, he studied medicine, but his health failing, he concluded to take up the study of pharmacy, which he prosecuted with a determination to master thoroughly. His subsequent success in business proves conclusively how much he was wrapped up in his profession. He conducted business for himself for over thirty-five years, and was one of the founders and active members of the original Board of Pharmacy of Kings County, since absorbed by the Board of Pharmacy of Greater New York. Deceased was highly respected by all who knew him, and was looked upon as an honest, conscientious snd reliable pharmacist. Mr. Newman was a life member of our Association, with which he connected himself in 1865, at the meeting held in Boston, Mass.

David G. Plummer, of Bradford, Ill., died on August 10, 1898, at the ripe old age of eighty-four years. Mr. Plummer was born in Lisbon, Me., in 1813. After receiving a good education, he, at an early age, began the study of pharmacy, studying the various branches with much zeal and thoroughness. He was especially delighted with the manufacturing department of his chosen profession, and, in his early days, was continually making experiments with a view of improving working formulas of galenical preparations. He conducted with much success a large manufacturing and jobbing business for many years in Portland, Me. In 1857, he removed to Bradford, Ill., and continued in business in that town up to the time of his death. He was one of the oldest pharmacists in the state of Illinois, and was well known and respected by all who knew him or had business dealing with him. Deceased was a life-member of our Association, and was elected a member in 1869 at the meeting held in Chicago.

F. W. Sennewald, Secretary of the Missouri Board of Pharmacy, one of the founders of the St. Louis College of Pharmacy, and one of the oldest druggists in St. Louis, died at his home in St. Louis on Wednesday morning, July 19, 1899. He had suffered from acute stomach trouble for many years. The final illness came upon him a few weeks before his death. Mr. Sennewald was born in Imbshausen, Germany, in 1832. In 1842, together with his eight brothers and sisters, he came to this country and went direct to St. Louis via New Orleans and the river, there being no railroads in those days. In 1845, he was apprenticed to A. B. Tscheppe, an old-time druggist, and remained with him for four years. After that he clerked for a time, Enno Sander being one of his employers. In 1855, he formed a partnership with William C. Lange, under the name of Lange & Sennewald, on Market street, between Eighth and Ninth streets. In 1857, the firm bought the drug store at Third and Market streets, which at that time was doing a very small business, but in a short time the business under the new management grew to be very large. In 1864, the firm was dissolved, and Mr. Sennewald continued the business under his own name until August, 1872, when, on account of poor health, he sold the business to Hugo Krebs, now deceased, and went into the toy and notion business. This calling was not active enough and he soon longed for the old profession, and in 1875 he erected the building at Eighth and Hickory streets, and established the drug store which he conducted until a few years ago, when he turned it over to his sons, E. A. and F. C. Sennewald, under the name of E. A. Sennewald & Co., both sons being graduates of the St. Louis College of Pharmacy. He was married in 1855 to Miss Euphrasia Metgzer. Five children were born of the union, of whom only the two sons survive, the others having died in infancy. Mrs. Sennewald preceded her husband seven years ago. Back in the fifties he was for a time instructor in pharmacy in the old Humboldt Medical College, and studied chemistry there at the same time. He was one of the founders of the St. Louis College of Pharmacy, and his name appears in the first board of trustees elected November 3, 1864. As treasurer of the college, he greatly improved its finances by the introduction of careful business methods into the office. He also served several

terms as president of the college at different times, and was continuously connected with it either as officer or trustee, until his appointment as a member of the Missouri State Board of Pharmacy in 1890, when he was obliged on account of the provisions of the pharmacy law to sever official connection with it. Mr. Sennewald was immediately made secretary of the board, and has served in that capacity ever since. He received his appointment to his fourth term of three years shortly before his death, the Missouri Pharmaceutical Association having unanimously recommended his name alone for the place at its meeting in June, something they have done ever since the expiration of his first term. It was largely due to Mr. Sennewald's efforts that the amendment of two years ago was made to the pharmacy law, abolishing registration on diploma, thus remedying the defect, as it was considered, of the law, which formerly permitted physicians, as well as pharmaceutical graduates, to register on presentation of their diplomas. He was first vice-president in 1869 in our Association. He was also vice-president of the International Bank at one time, and was vice-president of the German Mutual Life Insurance Company at the time of his death. All the officers and faculty of the College of Pharmacy attended his funeral in a body, and Prof. Francis Hemm and Henry Braum were among the pall-bearers. The interment took place at Bellefontaine Cemetery. Deceased became a member of our organization in 1865 at the meeting held in Boston, Mass.

William Stahler, of Norristown, Pa., came to his death suddenly on that ill-fated train on the Reading railroad at Exeter station on Friday evening, May 12th, 1899. Deceased was the proprietor of the leading drug store in Norristown, and a well-known business man of Eastern Pennsylvania. He was born in Midford township, Lehigh county, Pennsylvania, February 5th, 1826, the emigrant ancestor being one of the earliest settlers of Lehigh county. Mr. Stahler received a good common school education, and at the age of sixteen entered a drug store in the city of Philadelphia and began learning the business with which his name has ever since been so prominently identified. In 1856, he went to Norristown and purchased an apothecary shop which had been established on Main street by Dr. M. G. Kerr and Amos W. Bertolet. This establishment he conducted until 1876, building up meanwhile a large trade. In the latter year he moved to the large building known as "The Central Drug Store," at the corner of Main and Swede streets, which he had purchased the previous year. In this building the ground floor is laid with white marble, and the room is furnished with two counters, supporting six plate-glass show cases, between each of which the counter is laid with polished Italian marble. The rear is divided into prescription room, office and packing department, while the second story is fitted up as a complete laboratory for compounding drugs and medicine. In 1860, he was made a member of the town council of Norristown, and served in that capacity for six years until this spring, 1899, when he was again elected a member of town council. On June 3d, 1856, Mr. Stahler was married to Savilla Eschbach, of Norristown, and to this union were born three sons: Eugene A., born in 1857, married Ella Filbert of the city of Philadelphia, and is now engaged in the drug business at Bridgeport; William E., born in 1858, and educated in Pennsylvania College and Gettysburg Seminary, married Florence Allen of Virginia, and Harry Lincoln, who graduated from the Pennsylvania College in 1882, and was associated with his father in the wholesale and retail drug business at Norristown. Besides being an excellent business man, he was very charitably disposed, and was at all times willing to alleviate the sufferings of others, and many a sad heart was made glad by his timely contribution. He labored indefatigably and gave liberally for the success of his town. Deceased became a member of our Association at the meeting held at Saratoga, N. Y., in 1880.

Colin F. Stam, a prominent druggist of Chestertown, Md., died August 22, 1898, at his cottage in Atlantic City, N. J.. Mr. Stam has been in poor health for more than a year with complicated liver trouble, and went to Atlantic City, hoping to find in a

change of scene and invigorating ocean air, strength and renewed health. For a time, delusive signs of returning health led friends to hope that the patient would again be strong, but in a very short time he was suddenly stricken down, and after being unconscious for more than a week, he quietly passed away from cirrhosis of the liver. Mr. Stam was born on July 22, 1846, and was consequently a little over fifty-two years of age at the time of his death. As a young man, after having graduated with honors at Washington College in 1863, he entered the drug store of his father, John L. Stam, and mastered every detail of the business. On October 9, 1877, Mr. Stam married Annie H. Roberts, daughter of Dr. S. C. Roberts, of Chestertown. Deceased was one of the most highly cultured and popular citizens of Kent county, and is survived by his widow and seven children, viz.: Annie H., Louise Antoinette, Lillian Roberts, John Rudolf, Donald Ferguson, Susie Roberts and Colin Ferguson, Jr. Amid all the sadness of life, nature spoke in beautiful harmony to his highly sensitive ear. No blade of grass, no hidden nook or obscure corner of the great world around him was too humble or too small to send a thrill of pleasure to this man who looked through nature to nature's God, and walked in daily humility in the presence of the Most High. The poetry and beauty of his life was a well-spring of joy in his home. As father, husband and home-maker his character shown with greatest beauty. To those who knew it best, his home life was an inspiration. He was a man honored and respected by all who knew him, and the sad news of his death was received with great sorrow. In 1886 Mr. Stam erected a handsome town hall in the center of Chestertown, which will stand as a lasting memorial to his business enterprise. Deceased became a member of our Association at the meeting held at Niagara Falls, N. Y., in 1882, and was earnestly devoted to its best interests and welfare.

Charles A. Tufts, one of the most prominent of druggists and most conspicuous votaries of pharmacy in the state of New Hampshire, died at his home at Dover, on February 12th, 1899. Mr. Tufts had outlived his allotted three score and ten years by seven years, but his life was not so long that it had not been filled with usefulness. Not alone in his chosen calling of pharmacy had the deceased led an active life, but in political, educational and military affairs, he had always taken a leading part. He was also a graduate of Dartmouth Medical College, but never actively pursued medicine as a vocation. Mr. Tufts was next to the oldest business man of his city, having succeeded his father, Asa Tufts, in the drug business fifty years ago last January. The business had been carried on at the present stand by father and son since early in the century. The deceased was a graduate of the Massachusetts College of Pharmacy, and was a member of the State Pharmaceutical Association, which he had served as Treasurer. At the time of his death, he was President of the New Hampshire Board of Pharmacy, which position he had occupied since 1875. "A good man and a ripe scholar has gone from among us and we shall miss him," writes one who was officially connected with him on the Board. In city affairs, Mr. Tufts held a prominent place. He was clerk of the Common Council from 1858 to 1865, member of the City Council from 1868 to 1870, alderman from 1872 to 1874, member of the School Board from 1874 to 1881, and chairman of the Board from 1892 to 1894. He was also associate justice of the Police Court for several years previous to his retirement by age limit. At one time he was on the staff of the Governor of New Hampshire with the rank of Colonel. A widow, two sons and a daughter survive him. Mr. Tufts became a member of our Association at its fifth annual meeting, held at Baltimore in 1856, becoming a life member.

Anton Schürer von Waldheim, an honorary member of this Association, died at his home in Vienna, Austria, on the morning of August 13, 1899, in the 70th year of his age, leaving a widow, two daughters and three sons to mourn their loss. Mr. von Waldheim was born at Vienna, February 24, 1830. After receiving a collegiate education, he

entered the pharmacy of his father in 1846, where he remained for eight years, meanwhile pursuing a thorough pharmaceutical course of study at the University of Vienna. After two years' service in Dresden, Paris and London he returned to his native city in 1856 and took charge of his father's business, which he managed successfully up to the time of his death, a period of nearly forty-four years. Baron von Waldheim was wide and favorably known by reason of his great activity in all matters pertaining to the improvement and advance of Pharmacy, not only in his own country, but also in foreign lands. Pharmacists of other countries will probably best recall his name in connection with efforts made for the establishment of an International Pharmacopœia, a draft of which was presented by von Waldheim at Brussels in 1885. For many years he held the position of President of the Vienna Apothecaries' Society, the General Austrian Pharmaceutical Association and several minor local bodies. He was likewise President of the First International Pharmaceutical Exposition held at Vienna, Honorary President of the Second Pharmaceutical Exposition held at Prague, and served as Chairman of the Section on Pharmacy at the 66th Meeting of German Naturalists and Physicians held at Vienna in 1894. A. von Waldheim was present as a delegate at the International Pharmaceutical Congress held at Paris in 1864, at Vienna in 1868, at St. Petersburg in 1875, at London in 1881 and at Brussels in 1885, and was elected presiding officer of the Congress at St. Petersburg. He was a Knight of the Austrian Order of Franz Joseph and the Russian Order of St. Anne, and was enrolled as honorary member of the following societies: The American, British and German Pharmaceutical Associations, The British Pharmaceutical Conference, The Pharmaceutical Associations of St. Petersburg, Paris, Moscow, Madrid, Turin, Kopenhagen, Brussels, Antwerp, Prague and Budapest, and the Philadelphia College of Pharmacy. Deceased was elected an honorary member of this Association in 1871 at the meeting held at St. Louis, Mo.

John Edgar Wilson, of Walnut Ridge, Arkansas, was born July 7th, 1873, in Marshall County, Miss. His mother died when he was but a mere babe, leaving him and a two-year-old sister to the care of his father, George W. Wilson, and a beloved aunt, Amanda Coleman, now Mrs. English of Blossom, Texas. His father was poor (too generous to be otherwise), but made up in love and devotion to his children what he lacked in material means. Their home was in Byhalia, Miss., where John received a fair education, and began to study pharmacy. When he was but seventeen years of age, his father's health failed, and John was obliged to travel with him for a whole year, after which time his father died. He then went to Memphis, Tenn., at which place he continued the study of pharmacy, and, after some experience and close attention to business, he took charge of a drug-store for Mr. Crego, which he conducted with very satisfactory results to his employer until December, 1895. After his health began to fail, he changed his place of residence by going to Walnut Ridge, Ark., and engaged with his uncle, T. J. Wilson, and his brother-in-law, J. H. Sloan, in the drug business of the firm of Wilson, Sloan & Co., the deceased there taking charge. On November 11th, 1896, he married Miss Claude Phelps, daughter of Col. A. C. Phelps, of Walnut Ridge, a handsome and accomplished yonng lady. She died October 2d, 1897, and after this his health began failing rapidly. He went to Blossom, Texas, where he died on the 7th of February, 1898. His remains were brought to Walnut Ridge and deposited beside his young wife. He was a young man of good address, affable, friendly and made many friends wherever he went. The deceased became a member of our Association in 1896, at the meeting held in the city of Montreal, Canada.

George A. Zwick, of Covington, Ky., was born in Gœppington, Wurtemburg, Germany, March 14th, 1836. Inasmuch as his parents, George Zwick and Fredericke Zwick, *nee* Brocher, removed from his native place, and as he visited the Latin school there, he was left in care of his uncle, Carl Brocher. In his twelth year, 1847, this uncle emi-

grated with his family to America, the first stopping place being Ohio City, Ohio; thence, in 1849, they moved to Hamilton. In 1853, he came to Cincinnati, and entered as apprentice with Apothecary Backhaus, corner of Seventeenth and Main streets. He made use of every opportunity to this time to gain a good education, studying more zealously than ever, often burning the midnight oil to perfect himself in the English language, Latin and such other branches as might be useful in his business. Having completed his apprenticeship, he took a position with Mr. Hannaford, and shortly afterward, 1857, made his first trip to Europe, in order to complete his studies as chemist. Being disappointed in his expectation to collect certain money due him, he was compelled, after nine months' study, to discontinue same, and take a position as druggist in his native city during the winter of 1857–58, and then returned to America. He took employment with G. A. Hiller, at 76 Broadway, which latter business was acquired by purchase by Albert O. Zwick, who still successfully carries on this business. For part of the time Mr. G. A. Zwick served as partner with G. A. Hiller. During all this while, he never neglected an opportunity to further his education. Besides the German and English languages, he mastered the French completely, and spoke fairly well Italian. Equipped in this manner, he returned in 1862 for the second time to Europe, studying at Tuebingen and Paris, and obtained the degree of Doctor of Natural Sciences. After a sojourn of a year and a half, he returned to Cincinnati, and, together with the brother of the present mayor of Cincinnati, he conducted a wholesale drug business under the firm of Tafel & Zwick, in which G. A. Hiller was a silent partner. November 23d, 1865, he married Miss Julia Taxis, and lived happily with her for thirteen years. This marriage was blessed with four children, two boys and two girls. In 1866, Mr. Zwick moved to Covington, Ky., and purchased a drug store then owned by C. F. Fechter. Later Mr. Zwick acquired the drug store on the northeast corner of 11th street and Madison avenue from A. Fabra, which latter business he made his main store. In 1868, Mr. Zwick made his third trip to Europe, and as his second son, Carl G. Zwick, at present owner of his father's store on the southeast corner of 11th street and Madison avenue, took ill, his parents had to leave him as infant in the arms of his grandmother, who never surrendered him until his education was completed. Mr. Zwick purchased in 1872 the property on the corner where the business in his name is still conducted. In 1872 and 1876, Mr. Zwick again returned to Europe to post himself in the progress and advance of his science. December 20th, 1878, he lost his wife, and on December 22d he buried her at Spring Grove Cemetery. The following year he returned to Germany and married Mrs. Augusta Hiller, *nee* Taxis, a sister of his first wife, Mrs. Zwick staying for her health in Germany, together with the youngest daughter, Amanda, and the second son, Carl, who is studying at Wurzburg, who are mourning over the loss of their beloved husband and father, whilst the eldest son, Albert O. Zwick, in Cincinnati, and Miss Augusta Zwick, in Indianapolis, Ind., are doubly bereaved over the sad accident which so suddenly bereft them of their kind father.

Mr. G. A. Zwick has been a most systematic business man, and as druggist and chemist has been keeping abreast with the times, and while he practically retired from business three years ago, he still continued his interest in his business as well as in his science. He attended scientific lectures while abroad, and contributed to a number of scientific papers as well on this side of the ocean as on the other. He has conducted his business in such a manner that he gained the general respect of his competitors as well as the medical profession at large. His customers were his friends, and the poorer classes found in him a benevolent patron. His clerks and assistants, by his counsel and teaching, advanced, and many of them by his aid established in business in Covington and in the immediate neighborhood. A number of these he started up himself by establishing drug stores for them. The community lost in him a most public spirited citizen, and many mourn the loss of a true friend. On January 12th, 1899, a fierce storm was raging

all over southern Germany, and during that afternoon he postponed a promenade which he had planned with his wife, saying that no one would go out on a day like this except to be hurt; but when later in the afternoon his nephew, Dr. William Zwick, sent word to him that the Natural History Society would give a lecture at the museum in Stuttgart, and invited him to attend, he readily assented, and his nephew took tea with his family. He spent a most enjoyable hour, and they together at 7:30 o'clock went to attend the lecture. After the same had come to a close, at 10:15 o'clock, Mr. Zwick declined the company of his nephew home, and also the invitation of some friends to delay and spend a few minutes in their company, and hurried home, where he knew that his wife and daughter were anxiously waiting for him. Meanwhile the tempest had increased, and about 10:45 a fearful stroke of lightning and a fearful blast of the storm wind swept a four-story scaffolding opposite the very residence of Mr. Zwick from the ground. The strong poles carrying the structure broke like tooth-picks, and the scaffolding carrying machinery of some twenty tons was dashed across the street, burying Mr. Zwick within two steps of his door under the debris. After about two hours anxious waiting and searching by the watchman and police, they discovered the deceased with the back part of his skull crushed by the falling of a beam, causing instantaneous death. He was buried on January 15th, 1899, at Stuttgart, Germany. Deceased became a member of our Association in 1874, at the meeting held at Louisville, Ky.

In conclusion, your Secretary, in appreciation of the many courtesies extended to him by the officers and members of the Association by furnishing information on certain matters when asked, the promptness of which has considerable to do with making the duties of his office comparatively light and pleasant, desires to extend his sincere thanks to all.

Respectfully submitted,

GEO. W. KENNEDY,
Secretary Committee on Membership.

Applause greeted the reading of the report.

Mr. Main moved to receive the report and refer for publication. The motion was seconded by Mr. Payne and carried.

The Secretary read the report of the Committee on the Ebert Prize, as follows:

To the Officers and Members of the American Pharmaceutical Association:

Gentlemen: The Committee on Ebert Prize Fund of the American Pharmaceutical Association reports that in the opinion of the Committee, the prize for 1898 should be awarded to Prof. Henry Kræmer, of Philadelphia. for his paper entitled, "Quantitative Examination of Powdered Crude Drugs."

Very truly,

H. M. WHELPLEY, *Chairman.*
WM. M. SEARBY,
F. J. WULLING.

The Secretary next read the report of the Committee on General Prizes:

ANN ARBOR, MICH., *January* 28, 1899.

CHAS. CASPARI, JR., *General Secretary.*

Dear Sir: The undersigned committee on General Prizes unite in recommending that the several prizes provided by the Association for papers submitted at the meeting held in Baltimore, Md., August, 1898, be awarded as follows:

GENERAL PRIZES.

First Prize—To A. B. Prescott and H. M. Gordin, for their paper entitled "Certain Alkaloidal Periodides, and the Volumetric Estimation of Alkaloids as Higher Periodides."

Second Prize—To John Uri Lloyd, for his paper entitled "Standards for White and Black Mustard Seed."

Third Prize—To W. A. Puckner, for his paper entitled "The Standardization of Volumetric Acid and Alkali."

HERMANN HAGER MEMORIAL PRIZE.

No prize awarded.

JOHN M. MAISCH PRIZE.

To Henry Kraemer, for his paper entitled "Qualitatitive Examination of Powdered Vegetable Crude Drugs."

Respectfully yours,

J. O. SCHLOTTERBECK, *Chairman.*
FRANCIS HEMM,
JOSEPH E. MORRISON.

Mr. Diehl moved that the reports be received and the recommendations adopted. Carried.

The report of the Committee on National Legislation being next called for, Dr. Stewart, chairman, read it as follows:

REPORT OF COMMITTEE ON NATIONAL LEGISLATION.

In bringing this report before you for consideration, your committee begs attention first of all to certain fundamental propositions upon which its argument is founded, not because they are not already familiar to you, but to make clear the connection.

PROFESSIONALISM VERSUS COMMERCIALISM IN PHARMACY.

Pharmacy, or the art of preparing medicines, is indissolubly connected with and subsiduary to therapy, or the art of applying medicine to the cure of disease; therefore the pharmacist should practice his art in conformity with the same professional and scientific requirements as the physician.

Medicine is a learned, liberal and beneficent profession, requiring a high degree of education and skill in its practice, and subject to humanitarian motives, which necessitates the subordination of money-making to the service of humanity. Its beneficent and philanthropic attitude is clearly demonstrated in that department known as preventive medicine. Therefore the practice of the medical arts, including pharmacy, cannot properly be carried on as a commercial business in which money-making becomes the paramount object.

The physician is the custodian of the public health. His life is devoted not only to curing disease but to teaching the public how to prevent disease by finding out causes and how to remove them. By so doing he is constantly engaged in destroying the source of his revenue and doing away with the necessity of his own existence. Every day preventive medicine is enlarging its field and efficacy.

The knowledge of Materia Medica, and of the methods and processes by which medicinal agents are prepared and applied in the treatment of dis-

ease, properly classified and protected by a changeless nomenclature, constitutes an important branch of medical science.

Upon entering the medical profession, the novitiate takes upon himself the most solemn obligations to serve his profession and the cause of suffering humanity. He must use his utmost skill in treating the sick, whether his patient is able to pay for his services or not. He is under obligation to investigate diseases and the agencies for their cure, and to report his discoveries; and the profession is under equal obligations to aid him in presenting and developing his discoveries.

The pharmacist, as a practitioner of an important medical art, should be under the same obligations as the physician, and withhold no discoveries from his profession. He should publish his processes and methods freely, and do all in his power to add to the general fund of pharmaceutical knowledge. Dependent upon this knowledge are the colleges of pharmacy, authors of text-books, and the pharmaceutical press.

The professional ideal requires a mutual agreement between physicians and pharmacists, to establish and maintain one authoritative list of medicinal substances, with definitions, descriptions and formulas, known as the Pharmacopœia.

The commercial ideal is totally opposed to the professional ideal in pharmacy. It regards beneficence and altruism in its practice with scorn, conceals knowledge for trade purposes, considers colleges of pharmacy a menace to business, believes in text-books only so far as they can be utilized for personal gain, endeavors to monopolize the vocation of preparing medicine, seeks to prevent diffusion of knowledge of the pharmaceutic art, regards every member of the profession with jealousy and disregards the obligation of fraternity.

THE RAPID GROWTH OF COMMERCIALISM A MENACE TO PHARMACY.

The rapid growth of commercialism during the past twenty years is a menace to the educational and professional interests of pharmacy and to the Pharmacopœia. We need not go far to find the cause for commercialism. It is in part undoubtedly due to the want of proper pharmacy laws. Pharmacy cannot be practiced as a profession except under the protection of laws which shall limit the manufacture and sale of medicine to pharmacists and force them to conduct their business on professional, not commercial, lines. The vocation must be practiced on a basis of reciprocity, whereby all are forced to comply with professional and scientific requirements; for justice demands that every pharmacist should have an equal chance with his fellows to make a living, and he who gives away the knowledge of his discoveries is placed at a decided disadvantage unless he also receives knowledge in exchange. In the light of these facts, let us approach the important subject before us.

ACTION OF THE AMERICAN MEDICAL ASSOCIATION.

The Preamble and Resolutions adopted by this Association at its forty-fifth annual meeting, held at Lake Minnetonka in 1897 (see Proceedings for 1897, p. 90), was referred to the American Medical Association for endorsement. After careful consideration by the Executive Committee, it was this year reported to the General Session and adopted by that body. Said document, therefore, becomes the authoritative utterance of both associations. It recognizes the professional ideal in pharmacy, yet advocates the protection of the business interests of the pharmacist by permitting him to patent his processes, apparatus and machinery for manufacturing, and favors the use of brand marks for the purpose of distinguishing brands of well known products or preparations from other brands of the same articles on the market. But monopoly of products and preparations is not sanctioned. The pharmacist, under this arrangement, theoretically receives about the same protection as the physician who copyrights his books.

Exceptions have been taken to the work of your Committee on practical grounds, and as we have but one object to serve, viz., the welfare of the pharmacist, these exceptions must be met and frankly considered.

EXCEPTION OF THE SECRET NOSTRUM TRADE.

The first exception applies to unpatented products and preparations. It is said that we advocate taking away from the manufacturer the protection which he is justly entitled to, thereby interfering with his vested rights, and robbing him of his property.

Our objectors fail to discriminate between property in *goods* and property in marks used to distinguish between *brands*. We have never advocated the destruction of property rights in either. What we do say is that the attempt of the secret-nostrum trade to create monopolies in the manufacture and sale of medicinal agents belonging to the public, by concealing their identity and advertising them under coined names as new discoveries, is an invasion of public rights. They are the great "substitutors" and are attempting to substitute secret-nostrums in place of legitimate pharmaceutical preparations. To throw dust in the eyes of the public and thus blind people to the true state of affairs they cry "fraudulent substitution," and endeavor to create the impression that they are the educated pharmacists who are being defrauded, and our college of pharmacy graduates are both ignorant and dishonest. It is not fraud for a pharmacist to substitute an open pharmaceutical preparation of his own manufacture for a nostrum of secret composition with the buyer's consent. It is legitimate competition. All competition is substitution, and competition is what the nostrum manufacturers fear. Fraud exists where misrepresentations are made regarding the goods sold. Those who deceive

the public by lying advertisements are guilty of it; and those who prevent the public from being deceived thereby are a blessing to the community.

That the secret nostrum manufacturers are the culprits, not the pharmacists, is evident from the following quotation taken from a "Petition of the Proprietors of and Dealers in Proprietary Medicines, including the Wholesale and Retail Dealers in Drugs, of the United States," read at the annual meeting of the Proprietary Association of America, St. Louis, October 17–20, 1898:

The undersigned, representing the industries mentioned, hereby earnestly petition your Honorable House of Representatives and Senate of the United States, that the War Tax upon Proprietary Medicines may be promptly or speedily revoked, for the following potent and valid reasons:

1. Because it is founded upon entirely erroneous ideas as to the origin and value of these medicines, the general or prevalent idea being that these medicines are mere nostrums, the outcome of ignorance and greed for gain; and that they are of no value as curatives for disease and are deserving of no legal recognition.

Whereas the real fact is that they, to a very large and almost universal extent, are the best and most successful prescriptions of our most advanced and successful physicians. The story is simple. The physician, and the more eminent he may be the more likely this result is to happen, sends his prescription to his druggist, who carefully prepares and sends it to the patient; this is followed by others and others, all made of the same ingredients and the same proportions, and they are largely or even eminently successful. The druggist is alive to this—he knows from his own observation that he has in hand a cure for a certain definite form of disease, and gives it a name and launches it upon the public as a remedy for a certain form of disease.

PROTEST OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The American Pharmaceutical Association, as its Constitution shows, stands against the system of business by which the prescriptions of physicians entrusted to pharmacists are unfairly appropriated and launched upon the public as specifics for diseases. It therefore most emphatically protests against the above statements of the secret-nostrum manufacturers as unjust and damaging to the reputation of the pharmaceutical profession. There is in fact no drug which may be truly described as a specific or cure for any disease. Furthermore, the highest medical skill is required to diagnose each disease and recognize its various stages as they develop, and no prescription will answer the requirements of all the different stages of the same disease. When a medicine, whether it be the prescription of a reputable physician or not, is given a name and launched on the public as a *specific* or *cure*, when it is not, the person so doing is guilty of a moral wrong to the community. This principle is everywhere recognized by enlightened communities, and prohibitive or restrictive laws have been passed to control the secret-nostrum business in such countries as France, Germany, Austria-Hungary, Japan, Brazil, Argentina, etc.

The public should have at least the opportunity of knowing the medical ingredients and their percentage-composition of every agent used for the

prevention and treatment of disease, so that the people may be protected from the machinations of quackery.

It is admitted by the "Proprietary Association" in the above quotation, that so-called "patent medicines" are usually not new things, and the only invention about them is that of their names. When it is taken into consideration that no one except their manufacturers knows the true composition of these nostrums, the absurdity of claiming that the names given them are trade-marks used for the purpose of distinguishing between *brands* of well-known prescriptions, is apparent.

Again, as the claims made for these nostrums regarding their therapeutic value are not generally justified by the facts, it is evident that their manufacturers, when they make false representations in regard to these prescriptions, cannot come into court with clean hands and defend their alleged trade-marks. The burden of proof must needs fall upon the advertisers of such claims, and the proof cannot be forthcoming unless the true composition of their medicines is made known.

NAMES OF UNPATENTED MEDICINES PUBLIC PROPERTY.

The question of the private ownership of the names of unpatented medicines seems to have been very clearly answered by the courts over and over again, as the following quotations will show. The first one is from an English authority, but it applies, for trade-marks are considered from the standpoint of international law:

"The name of a secret preparation may be used by any one for goods actually prepared according to the recipe, for they are the goods indicated by the name, whether prepared by the original inventor of the recipe, or his successors in business, or not. Until the secret is discovered or betrayed, the goods of the original inventor, or his successors, can be the only goods to which the name is applicable, or which are denoted by it; but when other people can make them, the difficult question of fact arises, whether the name is merely that of the goods themselves, or that of the goods of the kind prepared or sold by the original inventor or his successors in business. This was well put by Fry, J., in the Angostura Bitters Case (Siegert *vs.* Findlater, 7 C. D., p. 813): 'I cannot say,' the learned judge said, 'that Meinhard may not, if he can, make a bitter identical with the plaintiffs', and if he does, I cannot prevent him from selling it as Angostura Bitters.' It is to be observed that the person who produces a new article, and is the sole maker of it, has the greatest difficulty (if it is not an impossibility) in claiming the name of that article as his own, because until somebody else produces the same article, there is nothing to distinguish it from. No distinction can arise from using the name of the class, so long as the class consists of only one species, for then the name of the species and the name of the class will be the same." (The Law of Trade-marks, by D. M. Kerly, M. A., LL. B., published by Sweet & Maxwell, London, Eng., 1894.)

"There must be some word, or sign, or device, other than a generic name and words of descriptive quality." (Commissioner's decision, 1881, p. 97.)

"So the words 'Night Blooming Cereus' were held to be invalid as a mark, being the proper descriptive appellation of the article." (Phalon *vs.* Wright, 5 Phila., 464.)

"The same rule defeated the adoption of the words 'Desiccated Codfish.'" (Harris, Beebe & Co.)

In the case of the "Balm of a Thousand Flowers," quoting from "Brown on Trade-Marks," Judge Duer, of New York, says:

"It is only the seductive name that they claim as their exclusive property, and doubtless from the experience in its value in the extension of their sales. This, however, is a species of property which in my opinion is unknown to the law, and that can only be given to one by an infringement of the rights of all. . . . It has been repeatedly held that a trade-mark cannot be obtained in a name where it is the proper name for the article, as in the case of Schnapps, the subject of the controversy in Wolf *vs.* Goulard, or where it has by general use become the proper name of an article which all manufacturers may use, as in the case of Dr. Johnson's Yellow Ointment, Godfrey's Cordial, and Essence of Anchovies."

"The policy that the mere use of a name to designate an article would give to those employing it the exclusive right to designate such article by such name, would be giving a copyright of the most odious kind, without reference to the utility of the application or the length of the title, and one that would be perpetual."

And another writer says:

"Neither the Trade-mark Law, nor the Copyright Law, nor the Patent Law, affords any such right, or, under the pretense of the same, allows any one to throttle trade under the alleged sanction of law.

"No one can claim protection for the exclusive use of a trade-mark or trade-name which would practically give him a monopoly in the sale of any goods other than those produced or made by himself. If he could, the public would be injured rather than protected, for competition would be destroyed. Nor can a generic name or a name merely descriptive of an article of trade, of its qualities, ingredients, or characteristics, be employed as a trade-mark, and the exclusive use of it be entitled to protection." Canal Co. *vs.* Clark, 13 Wall, 323.

"We of course understand that when a name is coined by one who *uses it as a trade-mark* upon a particular article, if that name is originally a lawful trade-mark, its subsequent adoption by the public as a common appellative cannot take away the right already acquired." Celluloid Co. *vs.* Cellonite Co., 32 Fed. Rep., 98.

But "When an article is made that was heretofore unknown, it must be christened with a name by which it can be recognized and dealt in, and the name thus given it becomes public property, and all who deal in the article have a right to designate it by the name by which alone it is recognizable." Leclanche Battery Co. *vs.* Western Elec. Co., 23 Fed. Rep., 227.

"A word which is the name of an article, or indicates its quality, cannot be so appropriated. Every one has the right to manufacture the same article, and to call it by its name or descriptive character." Phalon *vs.* Wright, Am. Tr. Cas., 308.

EXCEPTION OF PROF. H. C. WOOD.

Exception was also taken by Prof. H. C. Wood, President of the Convention for Revising the United States Pharmacopœia. He seems to thoroughly agree with our attitude on the trade-mark question, and expresses himself strongly on the subject, but does not agree with what we say about product patents. Quoting at length from his address on "Nostrums," read at the Centennial Meeting of Medical and Chirurgical Faculty of Maryland, Baltimore, April 25–28, 1899, (Journal American Medical Association, April 29, 1899, p. 908):

"The intent of the patent laws is that the discoverer shall be encouraged by the temporary right to his discovery, but that such right shall eventually lapse, so that the invention shall become the property of the whole people. The application of this principle throws out at once the patenting of the names of drugs, since the name which usage has given to a remedy will, for the mass of the people and even of the profession, adhere permanently to the product. Antipyrin, for example, will be known in commerce as antipyrin to the end of the chapter. Life is too short, and brain matter too precious, to consume either in saying phenyl-dimethyl-isopyrazolone. I have never heard of an American physician using the name adopted by the British Pharmacopœia "phenazone;" and I cannot remember seeing this name printed even in one English medical article. Now, if copyrights could be made to attach to the name antipyrin, the patent for antipyrin would for practical purposes be thereby indefinitely extended.

"No one has recognized more clearly than have our pharmaceutical manufacturers the force of considerations such as those just given, and the effort has been both persistent and widespread to obtain permanent proprietorship of a remedy by making its popular name a trade-mark, and in this way to destroy the intent of the patent law by obtaining through the laws governing trade-marks an exclusive right which has no ending.

"A trade-mark is, however, the sign of the brand, and not of the article. Originally it was a design. A lion rampant stood for a lion brand of starch, sugar, or what not; and the design, which was the sign of the product of the firm's factory or series of factories, was naturally the property of its inventor. Now it is claimed that a name may be made a trade-mark and registered as such. This claim, however, probably can not be sustained even under the present law. In the decision rendered by the United States Supreme Court in the case of Columbia Mill Company, of Minnesota, *vs.* W. W. Alcorn & Co., of Pennsylvania, the presiding judge said: 'That to acquire the right to the exclusive use of a name, device or symbol as a trade-mark, it must appear that it was adopted for the purpose of identifying the origin or ownership of articles to which it is attached, or that such trade-mark must point distinctly, either by itself or by association, to the origin, manufacture or ownership of the article on which it is stamped. It must be designed, as its primary object and purpose, to indicate the owner or producer of the commodity and to distinguish it from like articles manufactured by others.' In another case it was affirmed by the justices of the Supreme Court that: 'The office of the trade-mark is to point out distinctly the origin of ownership of the article to which it is affixed; or, in other words, to give notice as to who was the producer.'

"These decisions would appear to the lay mind to be sufficiently distinct and authoritative, but decisions of the Supreme Court can, I suppose, be countermanded, so to speak, by subsequent decisions of the same tribunal; and certainly the law should be made so clear and positive in its statements that no manufacturer would think of attempting evasion.

"The question as to what the patent law should be in regard to medicinal principles invented or discovered is not easy to answer. Should there be product patents, or should there be process patents? In other words, should the substance antipyrene (product) have been patented as a product, or should only the process by which the original discoverer produced antipyrin be capable of being patented? It is evident that the difference between product and process patents is not only clear but of vital importance to the inventor or discoverer. Supposing that an organic principle, of practical value in medicine, has been discovered and produced by a certain process; if the discoverer patents the drug he secures proprietary rights in its sale for the whole term of years provided for by the patent law. If, however, he can only patent the process of production, he acquires proprietary rights only until the time when some other chemist invents a new process which may be better or worse than the old, but which enables the second chem-

ist to compete with the originator, so to speak, who therefore practically loses the value of his patent. This time may be three weeks, it may be three years, it may be the whole term of the patent.

"The American Pharmaceutical Association has, I believe, expressed itself as being in favor of granting process patents only. The American Pharmaceutical Association is a most respectable, indeed a highly honorable, body, but it is to the interest of its members that the patent rights of chemic investigators shall be as loosely held as may be, and therefore it is possible that the minds of its members are unconsciously biased. I can not myself see why the man who practically invents a new principle such as antipyrin, should not have the same inalienable right to the result of his labors as had he who first placed the eye in the front of the sewing needle. It is probable that the law ought to recognize in its protection two classes of new remedies. No vegetable or mineral substance which exists pre-formed in nature, ready for the use of man, should be capable of being patented. It can in no sense be an invention; the discovery of its medicinal value is always largely the result of chance, not of foresight. A process for the extracting from a drug of its active principle might, however, be patented, so that process patents might be allowed for medicines of this class. On the other hand, when by synthetic methods a substance which is not found freely existing in nature has been made by a chemist, such substance may well be said to be an invention of the chemist, and to be therefore capable of patenting.

"In Germany there are no product patents allowed, only process patents; but in Germany it is the habit of the courts to be very liberal in the interpretation of patent rights, throwing the whole burden of proof upon the inventor of the second or new process, and requiring his process to be absolutely diverse from the first; whereas, in the United States, the courts narrow as far as possible the rights of the patentee, so that the new or second process may survive judicial decisions, although it was really founded upon the first process which had received a patent. This, at least, is the allegation of the chemic manufacturing houses of this country; exactly how correct it is, only long-time worshipers at the shrine of patent courts could say."

IS THE PHARMACY OF THE FUTURE TO BE A PROFESSION OR A TRADE?

It will be noted that Prof. Wood sees nothing but a commercial business in the vocation of the chemist. He says in the same address: "The question whether patents should ever be taken out by members of the [medical] profession has been so much discussed that every one must at least acknowledge that there are to this, as to other problems, two sides; but at present we are not immediately concerned with this subject, since the inventors or discoverers of new principles are chemists rather than practitioners of medicine." In other words, those who practice pharmacy, or the art of preparing medicine, are outside the professional fold, and free from professional obligations. This is the pivotal point of the subject. Is the pharmacy of the future to be a profession or a trade? The whole question of pharmaceutical legislation hangs on this point. As a commercial business, is not the pharmacist justified in using the same methods in creating a demand as the merchant in groceries and dry goods? Is he not justified in creating and maintaining monopolies of all kinds, and in boldly advertising his goods as the best on the market without furnishing scientific proof of his assertions? Such are the methods adopted by the nostrum trade everywhere. Is the nostrum trade right, and those who

preach professional pharmacy wrong? If so, where does it place our colleges of pharmacy who teach the professional ideal? Are they teaching a false ideal? Does this account for many disastrous failures by their graduates in after-life? These questions are vital, and germane to the subject.

U. S. COMMISSION ON PATENTS AND TRADE-MARKS.

As you are aware, His Excellency, William McKinley, President of the United States, appointed a Commission to prepare a revision of the U. S. Patent and Trade-mark Laws, and, as you probably know, the American Pharmaceutical Association referred the last annual report of its Committee on National Legislation to said Commission, with the request that the points contained therein relative to this important subject should receive the consideration of Congress.

The Commission referred to held sittings in New York City and at the Patent Office in Washington, at which your Committee was represented. At these meetings the subject of patents and trade-marks, as they apply to the practice of pharmacy, was taken up, and the representatives of the pharmaceutical interests present were listened to with courteous attention.

THE NAMES OF PATENTED MEDICINES BELONG TO THE COMMON LANGUAGE.

It seemed to be the impression of the Commission that so far as the private ownership of the commonly used names of patented products is concerned, the United States Supreme Court had settled the matter negatively and finally. As one of the Commission, Mr. Arthur Greely said: "The arrangement between the inventor and the government is that the former shall surrender to the public his right to restrain the free use of the invention at the expiration of the patent, and it is not likely that the government will permit the inventor to tie a string to his invention wherewith to pull it back after the patent expires."

The decision of the Supreme Court in the Singer Sewing Machine Case, which was re-affirmed in the Castoria case, appeared to carry great weight with the Commission. It reads as follows:

UNITED STATES SUPREME COURT DECISION.

"The result, then, of the American, the English, and the French doctrine universally upheld is this, that where, during the life of a monopoly created by a patent, a name whether it be arbitrary or be that of the inventor, has become, by his consent, either express or tacit, the identifying and generic name of the thing patented, this name passes, to the public with the cessation of the monopoly which the patent created. Where another avails himself of this public dedication to make the machine and use the generic designation, he can do so in all forms, with the fullest liberty, by affixing such name to the machines, by referring to it in advertisements and by other names, subject, however, to the condition that the name must be so used as not to deprive others of their rights or to deceive the public, and therefore that the name must be accompanied with such indications that the thing manufactured is the work of the one making it, as will unmistakably inform the public of that fact."

PRODUCT VS. PROCESS PATENTS.

The information brought out by the discussions at the several meetings of the Commission makes it necessary for the Association to reconsider its verdict on the subject of product patents as expressed in the preamble and resolutions. From a professional standpoint, the propriety of patenting inventions is one thing, but from a commercial point of view it is a different matter; and it is from the latter standpoint that we are unfortunately forced to discuss the subject.

By products is not meant natural products, but those resulting from the practice of the chemist's art. Shall we grant patents for the latter when they are chemical inventions in the meaning of the patent law? The patent law requires that such products shall be the result of processes in which a higher degree of skill is displayed than what is naturally to be expected from skilled chemists in the ordinary practice of chemistry. Theoretically, it appears indeed as if the limiting of patents to processes would best stimulate competition in the devising of new processes. So far as known, however, no method has been suggested whereby under present laws the manufacturers may secure the reward due them for divulging their processes by patenting them, unless the products themselves be also covered by the patents. Unless proper protection be afforded, a patent becomes a farce and comparatively of no value; for it is next to impossible, in most instances, to obtain sufficient evidence of infringement of process-rights, to establish a case in court. Request is therefore made by the Committee for information on this important point, so that justice may be done to the inventors of new and useful chemic products, that their business interests may be protected while they are benefiting science by publishing the results of their original investigations and discoveries.

The question of product-patents must be considered in the light of the foregoing. The fact that, as a rule, the products in question are not therapeutic inventions, should also be considered. A patent granting a monopoly to the inventor of a specific or cure for a disease, if such should ever be discovered, would be a very different thing from a patent on a synthetic product employed in the treatment of certain symptoms, while there are numerous other products, patented or unpatented, which may be prescribed and employed for the same purpose. A monopoly of a real cure for consumption or diphtheria, for example, might become a serious hindrance to public welfare; even if it were granted (as patents are) for a limited time in exchange for divulging it. On the other hand, if such a discovery were made and retained as a secret, and monopolized thereby, the menace would be even more serious. The principle, therefore, should be considered, and some method devised whereby, if such discoveries are ever made, sufficient reward of some kind may be offered for their publication, unless the Government, under such circumstances, proposes to exercise the right of eminent domain and confiscate them.

The existing rewards to those engaged in original research should be increased rather than diminished, and such investigations should be rendered thus sufficiently profitable to attract the very best talent of the land, and also to attract capital in aiding and developing research and progress in the field of medical chemical industry. It must be remembered, that in this country we have no pharmacy laws limiting the manufacture and sale of medicines to qualified pharmacists and forcing them to conduct their business in conformity to scientific and professional requirements; no great appropriations for the subsidizing of scientific men, so as to enable them to obtain a livelihood while devoting themselves to original research; neither have we a system of pensions whereby they may be supported when they become destitute. Without some method of financial support from the Government, either in the form of proper pharmacy laws, appropriations or patents, original investigation in chemistry and pharmacy will lag behind, secrecy in the manufacture of medicinal products will become rampant, and the nostrum business will be promoted instead of chemical industry and pharmaceutical practice.

However, if the Government should conclude to limit patents to processes only, the burden of proof should be thrown upon those claiming to have invented new processes for producing the same products. This might be done by compelling the inventors of alleged new processes to divulge them by applying for patents, so that the novelty in each case may be determined by the Patent Office. It is argued with force that it is the original inventor who conducts the expensive research which points out the way. It is he who sows the seed, and unless the new process should show decided novelty, and its inventor should pay a royalty to the original inventor, great hardship would often result, for the harvest would in many instances be reaped by those who have not sown, and the original inventor would have only his trouble for his pains.

EXCEPTION OF THE "PROPRIETARY PHARMACEUTICAL" MANUFACTURERS.

Exception was also taken to our definition of a secret medicine. It will be remembered that the preamble and resolutions contains the following clause: "We do hereby accept the definition of a secret remedy given by the official Medical Board of Saxony: 'Secret remedies are all those agents sold for the prevention and cure of disease of men and animals, of which the ingredients, percentage composition and method of preparation are not made public when first announced for sale. Such information must be complete and exact, in readily comprehensible language, and made known to all desirous of such information.'"

A medicine monopolized by secrecy is a secret medicine, whether secret as to ingredients, or as to methods of combining them. It is this knowledge of processes and methods of preparation that constitutes the science of pharmacy, and without its publication, what is to become of pharmacy?

To argue in any other way is to fool nobody except ourselves, and this ostrich-like procedure can only result in final disaster.

In case of patentable inventions when newly introduced, the protection now given by the patent law enables the manufacturers to meet the requirements of science. But there are products and preparations on the market, advertised in medical and pharmaceutical journals, which by no means conform to these requirements. What about them?

Though not known to science, some of these preparations are extensively prescribed by physicians. According to the statements of their manufacturers, their active ingredients and quantitative proportions have been published with sufficient exactness to enable physicians to prescribe them in a proper manner. But, we repeat, their pharmacy is secret, and they are monopolized by secrecy. The more valuable they may be therapeutically, the greater necessity for the publication of the methods of their manufacture pharmaceutically.

The names of medicines appearing in medical literature should represent something which may be duplicated at any time, otherwise their names will be meaningless to future generations, and the science of medicine correspondingly injured. It is therefore absolutely essential that such publication be finally made for the benefit of science if their merits as therapeutic agents are ever to be fixed with sufficient exactitude to give them a permanent place in the Materia Medica; and the results of their employment in treating the sick should be reported by the medical profession and discussed freely in the medical journals.

But the manufacturers of these preparations say to us, "we cannot conduct our business and pay for advertising space in the medical and pharmaceutical press if our protection is taken away from us. We may agree with you that if pharmacy were conducted as a profession we would gain privileges in exchange for giving away our knowledge for the benefit of competitors. But we must take things as we find them, and compliance with such requirements as you have stated would ruin our business, cripple the press, and be a misfortune to all concerned. The demands of science are important. That we well know. Show us a plan whereby we can comply with them and make a living in our business, and we will accede to these demands."

REGISTRATION OF WORKING FORMULAS SUGGESTED.

Two suggestions have been made for the purpose of aiding the manufacturer in this connection. The first secures the final publication of exact knowledge of the invention, the latter does not. The first plan was submitted to the commission on patents and is now under consideration. The Hon. Francis Forbes, chairman of the commission calls it a "secret patent" system, and says that similar plans have been adopted by other countries but have been given up. Why, he does not know, except it be to harmon-

ze their patent laws to ours. The plan is that Congress authorize the registration of working formulas by manufacturers of medicinal products and preparations in some department of the Government appropriate for the purpose which may give official endorsement of the claims made in advertisements relative to ingredients and percentage composition. And it has been further suggested that the department referred to be authorized to publish said working formulas after the lapse of a certain number of years to be agreed upon, for the purpose of protecting medical science from the loss of the knowledge of the processes and methods of their manufacture. The department could not be expected to pass upon the therapeutic merits of such products and preparations, for only by the experience of competent observers working for years under different circumstances and environment, and frequently comparing notes, can the true therapeutic merits of any medicinal agent be finally ascertained. By so doing, it is argued, the ingredients and percentage-composition of such products could be published at the time of their introduction under auspices guaranteeing their correctness, and standards established for their identity and purity. This would separate from secret medicines a class of definite products and preparations for medicinal use having the advantage of official endorsement, of not being secret so far as ingredients and percentage-composition are concerned, but not requiring the manufacturers to divulge their trade-secrets in the method of preparing them until a sufficient time had elapsed to make remunerative the capital invested in them. The articles themselves thus being raised to a higher plane, the reputation of those engaged in the manufacture of them would be increased correspondingly. This, in turn, would have a most salutary effect upon medical journalism, for it would give the stamp of verity to advertisements, increase the demand for advertised medicinal agents with physicians, and correspondingly increase the value of the advertising pages to the readers, to the manufacturers, and to the editors and publishers. Then the merits of the agents could be freely discussed by the medical journals, thus promoting progress in the knowledge of their value in the treatment of the sick.

PLAN OF THE BRITISH ANALYTICAL CONTROL.

The other plan suggested is known as the "British Analytical Control." If adopted it would establish a voluntary censorship over the introduction and marketing of new remedies and protect the reputation of those who manufacture the older products and preparations, as well as the new, but it does not provide for a final publication of working formulas for the benefit of pharmaceutic science. Quoting from "The British Food Journal, the Official Organ of the International Commission on Adulteration," for January, 1899, p. 7 :

THE BRITISH ANALYTICAL CONTROL.

Objects.

1. To protect the health and the interests of the public by affording an authoritative and permanent guarantee that the nature, substance and quality of food and other products are in accordance with the demand and expectation of the purchaser, and by directing attention to those products which, being under permanent analytical control, may be accepted as free from injurious or doubtful constituents, and as pure, genuine and good in the strictest sense of those terms.

2. To protect manufacturers and importers against the unfair competition arising from the introduction and sale of imitations and of inferior or adulterated articles.

3. To enable private purchasers and consumers of controlled articles to satisfy themselves independently and without expense as to the characters and quality of any samples of such articles offered for sale.

Regulations.

1. A firm desiring to place an article under the British Analytical Control shall submit three samples of the article for scientific examination.

2. The samples shall be submitted in the unopened original packages, which shall be properly labeled and securely sealed.

3. If the results of the scientific examination show that the composition and characters of the article are such as to justify the conclusion that it is pure, genuine and good in the strictest sense of those terms, the analyses of the first samples shall be checked by analyses of samples of the same article obtained independently by the officers of the Control from wholesale or retail vendors. If the results are satisfactory the article shall be accepted and shall be placed under the British Analytical Control.

4. Any private purchaser or consumer of a controlled article shall be entitled to have such article analyzed by the Control without charge, on condition that the article is submitted for analysis in the original unopened package.

5. The officers of the British Analytical Control, at irregular intervals, shall purchase samples of the controlled articles for scientific examination and for the purpose of comparison with the original samples.

6. If, at any time, the examination of samples of a controlled article obtained by the officers of the Control, or submitted by a private purchaser, should show that such samples have been in any way adulterated or sophisticated, the firm concerned shall immediately be informed of the fact. Should wilful adulteration or sophistication be proved against the firm the Control shall at once be determined, notification to that effect shall be given to the firm, and its name shall be removed from the list of firms under the British Analytical Control.

7. The manufacturers and vendors of articles which have been placed under the British Analytical Control shall be entitled to state the fact in their advertisments and circulars.

Control Stamps.

The official stamps issued by the British Analytical Control are intended to be affixed to the packages or vessels in which the controlled articles are sold. The particular number assigned to each controlled article shall be inserted on such stamps.

Analytical Examinations.

The analytical investigations are carried out, and the advisory reports are furnished by experts of recognized position, who constitute the consulting scientific staff of the British Analytical Control.

BEARING OF THE SUBJECT ON THE COMING REVISION OF THE U. S. PHARMACOPŒIA.

The questions involved in this discussion bear directly upon the revision of the Pharmacopœia, and the next decennial convention meets at Wash-

ington next May. On account of the importance of the subject, and the fact that the Commission on Patents expected to report to Congress last January, your Committee addressed an open letter to the Committee for Revising the Pharmacopœia, which was published in the Philadelphia Medical Journal, Jan. 7, 1899. In this letter we gave the reasons to justify our action above stated, and said that we did not suppose the Committee on Revision would care to take upon itself a work which it was not organized to perform, but knowing that the members of the Committee had been selected by a congress of physicians and pharmacists, representing every section of the country, because of their peculiar fitness to deal with problems of that class to which this one belongs, we asked for individual expressions of opinion.

Our letter, and a special message concerning it, was sent to the Committee of Revision by the Chairman, Dr. Chas. Rice ; but after considering the matter, it was concluded that the Committee as such had no jurisdiction relative to what should go into the next Pharmacopœia. Prof. Wood's able address on nostrums was soon afterward delivered, however, and as he spoke in the light of the facts your Committee had gleaned, the effort was not lost.

Moreover, the *Philadelphia Medical Journal* editorially supported our work, calling its importance to the attention of the medical profession, and reprinted both letter and editorials for gratuitous distribution.

The Pharmacopœias of all nations, except the United States, Mexico, Chili and Greece, are issued under the authority of the respective governments, and therefore partake of the nature of national laws. Your Committee on National Legislation, therefore, is justified in concerning itself in relation to the Pharmacopœia, especially as the admission of patented synthetics to its pages has been proposed.

REQUIREMENTS OF THE PHARMACOPŒIA.

Before a medicinal agent can be made official in the United States Pharmacopœia, it must conform to the requirements of science. This statement, we believe, is generally accepted as the rule. Medical science requires that each drug, chemical and preparation of the same, shall bear a name which shall belong to and identify it ; shall mean that particular thing, kind and variety of it, and mean nothing else ; and that such name shall belong to the common language, so that it may comport with medical and pharmacal nomenclature. It also requires that exact knowledge of the substance shall be published in language sufficiently explicit to permit of its complete recognition. In relation to preparations of drugs and chemicals, complete knowledge of ingredients, percentage-composition, and method of preparation shall be published, so as to permit of their duplication at any time by those who are skilled in the art of pharmacy and chemistry.

Standing right in the way of the Pharmacopœia has been the question of the private ownership of names, for the admission of private names into

that work was not to be thought of. But that question seems to have been settled by the Supreme Court in the Singer Sewing Machine case, as above stated.

Freed from that trade-mark monopoly scheme, shall patented synthetics to be made official in the U. S. P.? The objection has been urged that being introduced by advertising their therapeutic value is problematical, but that objection no longer maintains regarding some of them which have been introduced for sufficient time to give them a permanent place in the materia medica.

Another objection is the commercial prestige which will accrue to their manufacturers. This might be answered by saying that such prestige should be part of the reward given the inventor for divulging his invention by patenting it. As stated by Terril in his treatise on Patent Laws:

THEORY OF THE PATENT LAWS.

"The theory upon which these laws rest is that it is to the interest of the community that persons should be induced to devote their time, energies and resources to original investigation for the furtherance of science, the arts, and manufactures. This was recognized from the earliest periods which can pretend to be described as civilized. It is to the advantage of the whole community that authors and inventors should be rewarded, and no measure of reward can be conceived more just or equitable, and bearing a closer relation to the benefit conferred by the particular individual, than to grant him the sole right to his writing or discovery for a limited period of time."

SHALL WE INDORSE PRODUCT PATENTS BY ADMITTING PATENTED SYNTHETICS INTO THE PHARMACOPŒIA?

If we are to indorse the application of the patent law to pharmacy so far as to sanction a limited monopoly of products resulting from the chemic art in exchange for a publication of exact knowledge of each new addition, why withhold credit and commercial prestige to the patentee? Professional men in medicine and pharmacy have advocated for years that we should use every effort to have laws placed on our statute books and enforced against medical monopolies of all kinds. We have made certain exceptions by passing the Preamble and Resolutions favoring patents on processes. Shall we go a step further and admit patents on products? If so, where do we then stand? We stand against monopolies created by secrecy as to processes or products, but admit that until a period of civilization and enlightenment is reached permitting the enactment of laws and their enforcement limiting the manufacture and sale of medicines to those who are educated and trained as pharmacists, and forcing them to conduct their business on humanitarian grounds, the protection of the patent law to medical chemical industries is ethical and right.

F. E. Stewart, M. D., *Chairman*, New York City,
A. E. Ebert, Chicago, Ill.,
J. W. Gayle, Frankfort, Ky.,
H. M. Whitney, North Andover, Mass.,
H. P. Hynson, Baltimore, Md.

The reading of the paper was followed by applause.

Dr. Rusby, seconded by Mr. Burkhardt, moved that the report be adopted and published in the Proceedings. Carried.

Dr. Rusby: In my judgment, this is a report that cannot well be discussed until it has been studied. This is a subject we are all fond of dodging. It is a difficult and complicated one, but a very important one, and before we attempt to discuss it we ought to think carefully over it. I believe that in the Section on Education and Legislation some definite action will be recommended in regard to this report, and I move it be referred there for discussion. Before this Association meets next year, the Pharmacopœial Convention will have met. That Convention will decide on certain principles with regard to the National Pharmacopœia which are really revolutionary, and I believe that for that reason this subject is of as much importance as any that will come before this Association at any time. A great change has taken place throughout the country, and I am sure there will be a recognition of proprietary rights in the next edition of the Pharmacopœia. It will be like opening the flood-gates of a reservoir. That class of proprietary articles which right-minded men can support and aporove of are not the ones whose makers are clamoring for recognition there, but it is the irresponsible ones, and a great pressure of corruption will be brought to bear to bring about that result. There is no question about it. Of course, not ten per cent. of the proprietary articles can be admitted there with any sort of propriety. The number admitted must be very small, and selected with the best knowledge that can be brought to bear on the part of the American Pharmaceutical Association and that of the medical profession of the country. There will be no time when the Revision Convention meets to discuss all these questions. This work must be done by this Association now. I have every reason to ask that those present will recognize the importance of this matter and read this report over carefully, and come to the meeting of the Section on Education and Legislation prepared to express their best judgment, after careful thought. (Applause.)

The President: You have heard the remarks of Dr. Rusby and his motion to refer the discussion of this report to the Legislative Section. Is there a second?

Mr. Hallberg seconded the motion, which was put and carried.

Mr. Thompson: Mr. President, we all listened with interest to the report of the Secretary of the Council, and in this report he stated that this was his twenty-fifth annual report to the Association. We who have been associated with him in the work of the Council know how much of personal sacrifice this means in these twenty-five long years; and while we may pass a vote of thanks to him for this report, it seems to me something more is necessary to express our appreciation of his work; and if the members of the Association feel as I do about it, I would ask them to vote for a motion that Prof. Good be appointed a committee of one to draft a resolution expressing the feeling of this Association for the services of Mr. Kennedy during these twenty-five years, to be engrossed and presented to him on behalf of this body.

Mr. Hallberg seconded the motion.

Mr. Good: I feel very much complimented, indeed, to have Mr. Thompson single me out in this conspicuous way, but I would rather have the motion amended so that a committee of three shall be appointed, of which Mr. Thompson shall be chairman. I would suggest another man who has been intimately associated with Mr. Kennedy in the work he has done, and that is Mr. Sheppard.

MR. THOMPSON: I would not like to spoil the motion in that way, Mr. President.

MR. GOOD: Mr. Thompson, as mover of the resolution, is entitled to the chairmanship, and I would be glad to act with him.

MR. MAYO: I move to amend by suggesting that a little pin of some kind be substituted in place of the engrossed resolution. It would be a memento of value, and Mr. Kennedy could wear it when with us, and I think it would be entirely appropriate.

MR. THOMPSON: I accept Mr. Mayo's suggestion.

MR. GOOD: If Mr. Mayo will agree, I think suitable resolutions should accompany that badge. The resolutions need not be engrossed.

Mr. Mayo consented to the suggestion.

THE PRESIDENT: It has been moved and seconded that suitable resolutions be drawn up by a committee consising of Mr. Thompson, Mr. Good and Mr. Sheppard, to express the feeling of appreciation of this Association of the long and faithful services of Mr. Kennedy, and that they be accompanied by a suitable pin or other design, and I will put the vote.

The motion was carried unanimously and with applause.

The chair announced that the next committee from which a report was desired was that on National Formulary, C. Lewis Diehl, chairman.

Mr. Diehl read the report as follows:

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.

To the American Pharmaceutical Association: In compliance with the request of the Chairman of the Council, acting under instruction and authority of the Association, the undersigned has prepared, and herewith submits, the manuscript for an epitome of the "National Formulary." This was at first thought to be a simple task, and to those who have occasion to peruse its pages it may seem so; but, as a matter of fact, it required considerable thought and labor to get the subject matter in such shape, that without becoming prolix, the little work would encompass—as it should—a complete epitome of the "Formulary," leaving out nothing that the Association, through its Committee, had found it proper to embody in the work. As is well known, concession has been given to various pharmaceutical bodies, and some individuals, to publish epitomes of the "Formulary" for their own account, but in the interest of the pharmaceutical and medical professions of the United States, in the hope that such action would popularize the "National Formulary." It is believed that this hope has not been altogether unjustified; yet the success has not been commensurate with the expectation. This failure, in so far as it may be so designated, is largely due to a want of uniformity in the different epitomes that have been issued; to the more or less imperfect manner in which the subject matter has been treated; and to the garbled adaptation of the text to local conditions.

In the manuscript herewith presented every formula stands out clear and by itself, so that the physician, for whom the epitome is intended, may by brief consultation become acquainted with all of its components and their absolute quantities, without, however, embarrassing him with any details of process whatsoever; for with these he is not concerned. Classes of preparations, such as emulsions, effervescent powders, fluid extracts,

tinctures, &c., are introduced by brief remarks pertaining to their general character or preparation. Preparations intended only as adjuvants, vehicles, &c., are dismissed by such simple designation, after giving their formula or composition. In all other cases the medicinal properties of the preparations are designated in accordance with their physiological action; the diseases in which they are useful are mentioned, and these, in the case of preparations intended for internal use, are followed by the average adult dose, expressed in metric weights and measures, interpolated by their equivalents in apothecaries weights and measures; the whole being supplemented by a "Therapeutic Index" indicating under proper headings the physiological activity of the several preparations described in the "Epitome." The printed pages herewith presented exhibit the manner in which this compilation has been made, and afford a basis upon which the size and number of pages of the little work may be calculated. Using a style of type and arrangement similar to that shown, it has been calculated that a book of convenient dimensions for pocket use need not contain more than 100 pages—about 80 for the formulas, the other 20 for title page, introductory and index. If suitably thin paper is selected, of a quality that does not show the print from the reverse side, the book will not be thicker than those in similar use by physicians and not so thick as many of them now used by physicians with convenience.

In so far as the pharmaceutical features of this epitome is concerned, the compiler feels confident that the interpretation has been correct. He is not willing, however, that his interpretation of medical properties, uses, and doses, should be accepted as final, and therefore recommends that these be submitted to a medical expert, or experts, for revision and correction. In order to facilitate the final disposition of the epitome, and in the belief that many of the interpretations of the physiological action of the preparations will be found correct, the preliminary work for the "Therapeutic Index" has also been prepared, and is herewith submitted.

Speaking for the Committee on National Formulary, the Chairman would say that since the issue of the revised edition of the "Formulary" quite a number of criticisms on some of the formulas given in it have appeared in current pharmaceutical literature. With few exceptions, these are of trivial character, and do not call for an immediate revision or a revision in the near future. On the other hand, there are quite a number of preparations now commonly prescribed for which formulas might with advantage be given in the "Formulary." The near approach of the Convention for the Decennial Revision of the Pharmacopœia of the United States, however, makes it impracticable that a revision be made at this time for this purpose; the more so, since it appears quite possible that a number of these, as well as many of the formulas now in the "Formulary" may be accepted in the forthcoming revision. There should, therefore, be some way devised whereby preparations in popular use may receive the recognition of the National Formulary, so that existing variations in popular preparations introduced under the same titles may become obliterated, or preparations of the same or similar composition, but bearing different titles, may be prescribed under designations and formulas given under the authority and sanction of the National Associations of Medicine and of Pharmacy, pending the revision of either the Pharmacopœia or the National Formulary. It is suggested that possibly a collection of such formulas might with advantage be made in the form of a supplement, to be issed from time to time in connection with the "Epitome."

Respectfully submitted, C. Lewis Diehl, *Chairman.*

The reading of the report was applauded.

Mr. Kennedy moved to receive the report and refer the same for publication. Dr. Stewart seconded the motion, and said:

It seems to me the suggestion made here is very much the suggestion made by the committee on National Legislation. Here is a published list of the preparations that are advised by the Association, and a list of the therapeutic indications of them. Any one who wishes can buy the book. There is no secret about it.

The motion was put and carried.

MR. HALLBERG: I have a few suggestions to make with regard to the National Formulary. I am not sure if this question was brought up at the last meeting, not being present. I mean the consecutive numbering of the formulas. You remember that in the revised edition of the National Formulary there was a change made in the numbering, and the result is that a person who has the original first edition of the National Formulary, who refers to a certain preparation by number, might possibly have an entirely different preparation given him, the last edition being used. I don't know whether the committee has taken that matter into consideration.

MR. DIEHL: Yes, sir; it has. But I have not the introductory portion of the epitome with me; the secretary has it in his hands. I have gone so far, even, as to write out the title page; and it might have been of interest to the Association if it had been read, but I did not consider it necessary at the time, though I see now it might have been desirable. But after stating the object of the epitome, which is done briefly, I make a note to this effect, that in prescribing the preparations of the National Formulary it is requested that physicians use, as far as possible, the full titles of the preparations, followed by the letters "N. F." and as a caution it is said that the serial numbers in the Formulary are intended purely for the convenience of the compounders of medicines. These numbers will necessarily vary with each edition, and physicians are cautioned never to use the numbers in prescribing any particular medicine. I think it is stated clearly enough for the comprehension of any intelligent physician.

DR. WHELPLEY: The Chairman of this Committee referred to the fact that a number of formulas are desirable as additions to the National Formulary. Would it not be in place for the Association at this time to take some action in the matter? It will undoubtedly be some time before the U. S. Pharmacopœia is revised and in the hands of the druggists of the country, unless the work is done much more rapidly than it was ten years ago, and the National Formulary is now gaining favor with the physicians to an extent that it never has before, and we should make it as perfect as possible. It seems to me that a supplement to the second revision of the Formulary could be easily prepared, at small expense, and placed in the back of that edition—that it could be prepared and sold for that purpose. I would like to ask the chairman if that is not practicable. Could we not get out a supplement, or addendum, to the second edition in this way?

MR. DIEHL: I think there may be forty or fifty formulas that will be required, but I have been too much occupied with other work to speak accurately upon that point.

On motion of Mr. Hynson, Chairman, the report of the Committee on Practical Pharmacy and Dispensing was made the special order of business at a short general session to be held just before the time set for the first session of the Commercial Section at 3 o'clock p. m., this day.

On motion of Mr. Main, the Association then adjourned to the hour indicated.

THIRD SESSION—TUESDAY AFTERNOON, SEPT. 5, 1899.

The Third General Session was called to order at 3 : 30 p. m., in the west parlors of the hotel (where all succeeding General and Section Sessions were held), previous to the first session of the Section on Commercial Interests, President Dohme in the chair.

The Chair announced that the special order of business was the consideration of the report of the Committee on Practical Pharmacy and Dispensing, and asked the Chairman of the Committee to read its report.

Mr. Hynson read the report, premising the same with the following remarks :

Mr. President and Gentlemen, if there is any one favor that I would ask of the members of the Association it is this: not to consider this report from an individual standpoint—as the work of an individual or committee, but as the work of the Association. Do with it as you see fit, without regard to the committee. I think individuality should not be considered in the work of the Association.

REPORT OF THE COMMITTEE ON PRACTICAL PHARMACY AND DISPENSING.

"Disappointed, but not discouraged," would make a terse report for this committee, yet it will fully express to all interested members exactly what a year's thought and a year's work has effected. Those who suggested the formation of a special committee on practical pharmacy and dispensing and those who advocated its establishment, had no doubt witnessed the waning interest of the practicing pharmacist in the affairs of this Association and had seen his gradual disappearance as a co-builder of its already immensely imposing and steadily growing monument—its Proceedings. They had no doubt noticed that in the beginning the dispenser was indeed the Association's strongest and most helpful force, was its veritable organization. Two score years ago, eighty-four per cent. of the membership from one state, a fairly representative section, was made up of retailers, and even twenty years later eighty per cent. of dispensers could be counted, yet these were not then near so active in the meetings and their work was scarcely apparent in the Proceedings. Another score of years rolls by and this class of pharmacists represent but fifty-seven per cent. of the same membership, and were it not for the facile pen of one member and the recklessness of another, the work of this class would not have been seen at all in the last issue of the printed Proceedings.

No matter what these facts may prove or what they may suggest, all of us are impressed by the conviction that much of the real burden is still borne by the retailer; that he yet makes up the large part of our membership, lends his endorsement and loyal support; all the while proudly owning allegiance to an Association which has done so much to elevate his profession, but which has rapidly grown without his control and has aided in the entailment of burdens and restrictions which promise more or less than we can foretell. Can any one deny a distinct tendency; the question must be asked: "Whence the leading?" Thoughtfully observe how one after another of the distinguished pioneers are dropping out of the ranks; their places will be filled—by whom? Understanding the plain object of this committee was to check the changing tide if possible; to interest the retailer and draw from him some of his rich stock of information which daily experience and actual demand has given him; to stimulate him to a greater and more useful exercise of his membership privileges, we have directed our efforts, as nearly as possible, exclusively, towards such members as could be properly classed with ourselves. The President seems to have clearly understood the purpose of the body, making it repre-

sentative both as regards character and territory. Early in the year the chairman consulted his associates and it was thought wise to divide the several provinces, states and territories, as equally as could be, among the members of the committee. It was determined that this should be the work of the entire body and should not be delegated to any one member. By this division of labor the entire country has been thoroughly covered and in a variety of ways. Circulars and direct letters have been used, personal appeals have been made; over one thousand members have been appealed to, care being taken to make the call as earnest as possible. Your committee submits herewith several forms of letters used, together with a card of suggestions. As many members of the committee as could give the time, have labored earnestly and interestedly and, where the individual failed, the chairman covered the ground, so that we have no apologies to make for neglect of duty. It may be that we have failed to make the work attractive. If this be a charge, we accept it, feeling that to have done more was beyond our ability. By the first of May we had completed our general correspondence, hoping it was just then that it would win its most fruitful reception. The expenses of the committee have exceeded the appropriation by about $15. This was assumed by your servants rather than that their efforts should fail of completeness. It may be well to state that exclusive of two dollars, paid a typewriter, the entire amount was spent for stationery, printing and postage.

IMPROVEMENT OVER LAST YEAR.

Owning our disappointment in the very beginning, we are now free to confess it. Yet, in view of the fact already stated, that the class appealed to had been almost inactive in this line of work for quite a number of years, we feel that we have accomplished something. The trial made by the Association is encouraging. The interest shown by the members of the Committee, the really good honest work done by the associate members, which the chairmen would acknowledge, is encouraging. The number of replies, although comparatively small, is yet encouraging, and the amount of matter submitted, although for such a number as our membership offers entirely too meager, is many times more than was had from retailers last year, and is therefore encouraging.

The Committee submits the belief that this effort should not cease; that it should be again taken up by an entirely new body, which, noting the methods employed this year, should try others with the same object in view. We will not disparage the little gleaned, but will present it, hoping in some instances to get your help for those who ask it and because it will bring to us all lessons in teaching and writing which, if we profit by them, will help us to lift to a higher plane those less fortunate; will enable us to see plainly that the "ripples" of our own making have not, as we thought, extended throughout all the bounds.

SUGGESTIONS RECEIVED BY THE COMMITTEE.

The Committee is pleased to call attention to the following suggestions and notes received by it. Many, indeed all of these, are from members whose conclusions are based upon actual trial.

Mr. E. R. Selzer advises the addition of oil of cinnamon directly to the compound chalk powder, in proper proportion to take the place of the oil in the cinnamon water directed by the pharmacopœia. He is of the opinion that the presence of the oil will prevent fermentation in the powder which sometimes occurs when it is not properly dried.

Mr. Wm. Mittlebach says compound tincture of gentian should be allowed to stand at least a year and to undergo varying temperatures before being filtered. This procedure will prevent the usual precipitate forming after filtration. He is also satisfied that the 1880 formula for compound soap liniment is to be preferred to the later formula, which he thinks unsatisfactory. He is of the opinion that elixir of iron, quinine and strychnine

phosphates should not be made in large quantities, and should be stored in small bottles perfectly filled to avoid the discoloration of the product, which, he says, is prone to become dark.

Mr. J. H. Schmidt has had trouble with the U. S. P. effervescent solution of magnesium citrate. He boils and cools the water just previous to using and adds the syrup of citric acid to the solution before filtering. In this way he secures a "sightlier" preparation and one which will remain clear. To save time, in making camphorated tincture of opium, he uses 40 Cc. of the tincture instead of 4 grams of the powdered opium.

Mr. J. F. Kiedaisch, Jr., offers the following formula for syrup of tolu:

Balsam tolu	1.28	ozs.
Sugar	7	lbs.
Water, enough to make	1	gal.

Place the balsam tolu in a mortar and add 1 pound of sugar, rub them together into a coarse powder, then mix with the remaining sugar. Prepare a percolator as described under "Syrup," U. S. P. 1890, into which put the mixture and proceed to percolate with distilled water: returning portions of the percolate until it runs through clear.

Mr. H. L. Emmerich suggests a plan, which he terms the Chicago short cut, for facilitating the preparation of phosphorus pills when such are also to contain other medicinal ingredients. Make a mass of all ingredients except the phosphorus, cut into the required number of parts and press into each part a sugar-coated granule containing the exact fractional part of phosphorus intended for each pill as found by calculation from the prescription; finally roll and finish the pills as usual. The same writer suggests that the quickest and most satisfactory method of mixing light and heavy powders is to weigh the powders into a mortar, stir with a spatula until a homogeneous mixture results, and then use the pestle to complete the blending of the powders.

Mr. H. T. Cummings calls attention to the necessity of thoroughly incorporating pilular extracts into pill masses. He advises that the extract be well softened with water before it is mixed with the other ingredients of the mass. He has also found the water-bath useful in dissolving the extract of licorice in making Brown Mixture.

Mr. Chas. H. Ware suggests the use of compound tincture of gentian as an acceptable flavoring for elixir of ammonium valerianate. He finds that the sugar for syrup of wild cherry is best dissolved by percolation and has much trouble filtering the solution of licorice for Brown Mixture. He asks why glycyrrhizin could not be used instead of extract of licorice.

Mr. E. P. Ferti submits the following two formulas as worthy of trial, the same having been found very satisfactory in his own hands:

SOLUTION OF MAGNESIUM CITRATE.

Magnesium carbonate	120 Gm.
Citric acid	250 Gm.
Oil of lemon, fresh	1 Cc.
Oil of orange, fresh	1 Cc.
Syrup	500 Cc.
Distilled water to make	2500 Cc.

Dissolve the citric acid in 1900 Cc. of distilled water and add to this solution 90 Gm. of magnesium carbonate, upon which the oils have previously been dropped. When solution is complete, filter and divide into ten equal portions, placing each in a strong bottle of 270 Cc. capacity. Add to the contents of each bottle 50 Cc. of syrup and 3 Gm. of magnesium carbonate and cork very tightly.

NOTES. Solution is complete in about 24 hours, with slight agitation.

The finished bulk is as big a draught as most people want.

Use only pure distilled water, crystallized citric acid, "cake" magnesium carbonate, fresh oils, and syrup prepared with "cube" sugar and distilled water. Do not use bottles with stoppers containing rubber.

SYRUP OF TOLU.

Replace the alcohol in the official formula with 15 Cc. of ether. Add the ethereal balsamic solution to 100 Gm. of powdered pumice (previously deprived of its soluble constituents by washing, first with dilute hydrochloric acid, then distilled water, then water of ammonia, then distilled water, and then dried) contained in a glass mortar of about 500 Cc.

Gradually add 500 Cc. of distilled water and triturate thoroughly. Transfer to a funnel or percolator and filter, returning the percolate till clear, adding distilled water to make 550 Cc. Dissolve 850 Gm. of "cube" sugar in the percolate, by percolation, and add, if necessary, syrup to make 1000 Cc.

Mr. William Gray offers the following formula for cold cream, and claims that it furnishes a product as nearly perfect as it is possible to attain. He says it will not become rancid and that the rose water will not separate from the base:

White wax	6	ozs.
Spermaceti	6	ozs.
Expressed oil of almonds	3	lbs.
Rose water	1	lbs.
Sodium biborate	30	grains.
Oil of rose	2½	drachms.
Oil of patchouly	5	drops.

COMPARISON OF CONDITIONS.

These notes, with the papers to be read, sum up the results of our efforts so far as interesting the members is concerned, and is the full amount of material we could draw from their well-filled storehouses. Your committee is not, however, content to end here; it believes that the work can be better advanced if the condition of to-day is compared with that of twenty and forty years ago. We believe in this way we can better discover the true tendencies of pharmacy and may, perhaps, find much of encouragement by this retrospective comparison of the long ago, the yesterday and the to-day.

It happens that one of our members has the good fortune to be in a position to make this comparison. He has files of prescriptions filled in the same locality, written by the same class of physicians, for the same order of customers, consecutively for forty years. This is unusual in a large city where localities are constantly changing. It is seldom in the history of cities that the haunts of the wealthy of forty years ago are not now the marts of trade or the abiding places of the masses. To make the comparison more complete, one thousand consecutive prescriptions of the years 1859, 1879 and 1899, each series beginning with March 1, were carefully examined in a manner to ascertain, if possible, the present status of dispensing pharmacy as compared with that of the same season twenty and forty years ago. At each period did these prescriptions represent the writings of more than fifty physicians, and in the last series, more than one hundred.

It has been said that pharmacy has degenerated, that much more was required of the dispenser in the "good old days" than now. We most positively deny this. The comparison made in connection with a close observation of the required manipulations prove beyond a question that the requirements of to-day are far beyond those of any period during the life of this Association. This statement refers to scientific attainments, ready and comprehensive knowledge and to technique, especially.

By thoughtfully scanning the accompanying table, much of instructive interest and healthful encouragement will be found:

TABLE NO. 1.

	Mixtures.	Solutions.	Powders.	Pills.	Ready-made Pills.	Capsules.	Ready-made Capsules.	Tablets.	Cachets and Konseals.	Lozenges.	Ointments.	Suppositories.	Plasters.	Simples.	Total Simples.	Combinations.
1859...	285	73	165	203	1	0	2	0	0	0	34	1	18	218	239	761
1879....	355	70	132	128	10	20	3	4	2	2	34	4	4	232	255	745
1899....	258	107	55	23	25	110	16	81	8	2	94	2	0	239	363	637

	Galenicals.	Proprietary.	Specifications.	Synthetics.	Extracts.	Fluid Extracts.	Infusions.	Decoctions.	Eye Solutions.	Incompatibles.	Different Articles in 100.	Articles in 100.	Time.	Metric.	Repeats.	Selling Value.
1859....	352	1	13	0	67	8	3	0	8	31	114	257	15	0	...	$258 89
1879....	415	87	52	0	86	39	7	1	17	4	....	....	24	0	375	377 15
1899....	460	184	83	56	57	14	5	0	42	1	125	256	11	17	938	382 15

TABLE NO. 2.

	Mercury; Calomel and Blue Mass.	Quinine.	Opium.	Morphine.	Ipecac.	Potassium Iodid.	Nux Vomica.	Strychnine.	Acid Hydrocyanic—Dilute.	Digitalis.	Codeine.	Atropine.	Cocaine.	Acetanilid.	Matico.	Musk.	Veratrine.	Sodium Hyposulphite.	Mercury and Magnesia.	Donovan's Solution.	Syrup Iodide of Iron.	Iodoform.	Acid Phosphoric.	Alkaloids.	Oleates.	Blisters.
1859....	164	48	88	50	145	14	21	8	29	12	0	0	0	0	5	3	2	1	1	1	1	0	..	..	0	13
1879....	52	93	65	40	36	23	21	9	9	3	5	4	0	0	0	0	0	0	0	0	0	1	1	..	1	3
1899....	47	70	17	16	10	18	25	33	3	1	34	10	10	8	0	0	0	0	0	0	6	2	0	17	4	0

Three prime facts are certainly brought out; changes have occurred; opportunities for galenical pharmacy still exist; much dispensing knowledge is yet required. We do not put up quite as many mixtures, but we make many more solutions, solutions of delicate and sensitive alkaloids, which have to be accurately weighed. Solutions which have to be made upon a percentage basis, unknown in the former periods; more spray solutions with their complexities, more eye solutions to be well-filtered and sterile. And the mixtures we make to-day, can one think them less difficult than those of forty years ago, or are the results of to-day less elegant? We make less pills, but we fill more capsules. Capsules filled with masses, capsules filled with powders, soft elastic capsules filled with liquids, oils and alcoholics. We wrap fewer powders, but we make many more ointments; ointments weighed by the metric system; not many, 'tis true, but more than in '79 or '59. Ointments we know, too, require more time, more good judgment than any other class of preparations. You can hide your faults better anywhere else than in your ointments.

Ready-made pills and ready-made capsules have come, but they do little to reduce our manipulations, surprisingly little, less than 4 per cent. of the prescriptions by the two combined. But you say tablets have come. Yes, these can claim just 8 per cent., no more, and any of us can make tablets at a small outlay for apparatus. In many instances they are less troublesome than pills or capsules. It is seldom that specifications are made,

and they might be less. Frequently special formula tablets are prescribed; so they have come, and konseals also have come. We have all these, beside all those our fathers and grandfathers had. Even a plaster must be spread occasionally; if not once in a thousand times, maybe, once in five thousand times. Suppositories are gregarious, yet they come to an overpowering degree, perhaps in the next thousand; they are rectal or urethral, cacao butter or gelatin. 'Tis true, we have more simples, one-third more; the tendency is in that direction; they are not all proprietary; many proprietaries enter combinations, and many galenicals are used as simples. We remember that this is about equalized. This tendency to employ ready-prepared combinations should help us, as it helps the larger manufacturers. For example, why not a National Formulary solution of iron and manganese peptonate? Is it less to our credit to keep Basham's Mixture ready-made, as we can now, than to prepare it for each call? The tendency is not bad, yet we must see that it tends our way.

That proprietaries have increased is, indeed, a truth. That a certain class of these have encouragement is not creditable to the medical profession, this the profession freely owns; that another class finally helps pharmacy, by stimulation, we must admit. New classes of elegant pharmaceuticals have originated in these proprietaries. Many of our much-used official preparations were formulated to take their places because they were popular. Specifications, it will be noticed, are few, and in five years have decreased. This is plainly marked by the efforts of the manufacturer made to promote specialties rather than to secure specifications—which failed. Specialties, too, will have their day, and specialties and proprietaries are the same. Endless comment, almost, could be made upon these tables, but we will not further impose upon the Association, just here, save to note the passing of the fluid extract, to call attention to the number of prescriptions repeated, while one thousand new ones are being filled, and lastly, to a very important matter, the prices.

"The good old days" show badly as compared with these "hard times," and we are convinced that the fairer days of '79 would be much farther behind us had not the ninety-three lots of quinine brought in two cents for every grain. The pricing of prescription is not a matter of individual caprice; we all know it is not. We will invariably charge all that competition will allow, no more, no less. The prices are largely regulated by trade conditions. This being so, conditions are better respecting prescriptions just now.

Incidentally we noted the number of times the more popular drugs were used in each of the series of prescriptions; also noted the same regarding some of the least used.

It is interesting to note the great decline in ipecacuanha stock, while we are surprised to find that it was ever so high. We all expected just what we find regarding mercury. The comparatively large amount of hydrocyanic acid used in '59 must attract attention, and it is fair to state that fully ninety per cent. of the incompatibilities of that year, if such they may be styled, were due to the combination of this acid with alkalies and, strangely enough, the one incompatibility recorded in the series of '99 was this same mixture.

There were some facts and oddities discovered in examining the prescriptions of 1859, which your committee believes will interest you. Attention has been called to the entire absence of metric prescriptions and prescriptions where definite percentages are required, as frequently found to-day. The largest "old time" dose found was fifteen grains each of calomel and jalap. It was not uncommon to find a thimbleful of a powder prescribed; whether a large or small thimble we could not discover. The one proprietary used was McMunn's Elixir of Opium. This is still prescribed.

Among the specifications, indeed, all of the thirteen, were for Henry's Magnesia, Blair's Syrup of Phosphates Compound, Ellis' Charcoal, and Andrews' Essence of Colombo and of Calisaya. This latter preparation must have been much more acceptable than the usual form of administration, by mixing the powdered bark in water. The doctors rarely signed their names, nor did they ever use a printed blank as now. It is sup-

posed that they could not be found, when wanted for revision of prescriptions, and that is, perhaps, why, when one wrote super-carbonate of soda, gr. xx., pulv. ipecac. gr.iijss., and *pulv. ipecac*, gr. iijss., no correction was made. The one who wrote Tr. opii acet., and followed this with "black drop" in parenthesis, left us wondering which he wanted.

They were fond of "salts" in those days; so fond that they ordered rochelle and epsom salts in the same prescription. Not quite so bad, however, as one of the "seventy-niners," who frequently prescribed six different makes of pepsin in a liquid preparation of the same, and on "off" days combined Quevenne's iron with reduced iron and iron by hydrogen, sometimes adding powdered iron for variety's sake. It was not he, however, who wrote for "stick licorice," "big stick." Emulsion of lycopodium was prescribed once. "My liniment" is a style of specification that is frank but not common. Battley's Sedative and Abernethy's dinner pills may have been known to our older members, but are not to the committee. Powders were frequently colored with Armenian bole, and by prescribing "half a powder" at a dose, the charge for the prescription could be reduced from "three levies" to "three fips." The prescriptions were priced in multiples of 6¼ cents, and this was not infrequently the charge. Mixtures directed to contain "sugar and ess. peppermint to season," occurred twice. A single pill was often prescribed, and a very large number of pill masses contained volatile oils. In one instance pills were directed to be coated with collodion, and the silver salts were frequently prescribed in pills with oxidizable substances without seeming precautions. We find preparations for the eye, like solution of borax and ointment of mercuric oxide were used then as they are to-day. Ointment of galls and opium was popular then as now. It is gratifying to know that our bald-headed friends of '59 enjoyed the benefits of the mixture of tincture of cantharides, aromatic spirit of ammonia, ether, bay rum, etc., just as they have profited by its use in our generation.

GALENICALS STILL USED.

Beyond and above all other items, the most encouraging fact established is that galenicals such as can be prepared by any competent pharmacist are still largely used. Four hundred and sixty (460) times were these ordered exclusive of extracts and fluid extracts, and without these more were employed this year than were ever before used. Here, where the pharmacist's best and most scientific work is done, are opportunities offered him, in spite of proprietaries, in spite of specifications, in spite even of—tablets.

We will not seek to be plentiful in detail, nor will we, if it is possible to avoid it, go over well-beaten tracks.

SUGGESTIONS BY THE COMMITTEE.

The committee in its further efforts begs leave to be suggestive; it will strive to offer sample notes of a kind which it believes will be interesting to active retailers.

'Tis to such that we would call the Association's attention as follows:

Dispensary and Laboratory.—The advantages of having these away from the public and apart from the sales department, are many and are generally obvious; there are also some objections and inconveniences. Yet it is very desirable that the prescription department and the place for manufacturing be as nearly together as possible, because the apparatus and facilities of one are often badly needed in the operations of the other. The comfort of dispensers is greatly augmented if they can relieve themselves of unnecessary clothing, suiting their dress to the weather and character of the work they are doing. Salesmen can also present, continuously, a better appearance when they are entirely relieved of laboratory work. The passage of work through separate hands adds many checks to errors.

Apparatus and Facilities.—A dearth of these makes quick work and good work almost impossible. A good mechanic can, it is true, work with poor tools, but it is

only through necessity that he does so, and much of his valuable time is consumed thereby. Water baths of various sizes and kinds should always be at hand and in condition to be readily used. A small tablet machine will pay for itself in a very short time, and will add to one's reputation. A konseal apparatus is almost indispensable. Suppository molds of sufficient number and variety should be in place, but three sizes of rectal and two of urethral are generally enough.

CONTAINERS.—Nothing adds so much to the facility of the dispenser and nothing adds so much to the appearance of his work as a suitable container. More than a few words regarding them will not be out of place.

It is really remarkable how many kinds of bottles can be used to advantage. Besides regular sizes, half-gallon and one-gallon bottles should be washed and held in place. Twelve-ounce bottles should be among the regular stock, and a twenty-ounce bottle is sometimes badly needed. Sets of blue-glass bottles, for external-use remedies, should be on hand, and amber bottles for solutions of silver salts, etc., are necessary; a set of moderately wide-mouthed bottles with short corks to fit, is stock constantly needed for tablets and granulated effervescent salts. Sets of glass-stoppered tincture bottles, flint and amber and glass-stoppered wide-mouth bottles, will be found most convenient. Full sets of homeopathic vials will not be out of place in the dispensary, and screw-cap bottles and jars of every variety will be found to be of great advantage. Screw-cap vials answer best for coated pills, for hard capsules filled with liquid and for tablets, but ordinary capsules and uncoated pills look badly in these and should be dispensed in boxes.

Pill boxes are generally had in proper sizes and in sufficient and attractive variety. If these are supplied with a label on bottom also, this under label can bear copy of prescription when required and should invariably be numbered to prevent mixing of tops, as sometimes occurs.

Powder boxes of different sizes should, of course, be had, but all powder boxes should be made to accommodate the same size powders, as folded, then it is easy to select the box which will nicely contain the powders prepared. Powders, naturally, do not always occupy the same space, and it is difficult for the dispenser to select the proper-size powder box beforehand, the necessity for which is removed by this uniformity of width.

Boxes for soft elastic capsules, plasters and suppositories; boxes for dusting powders with perforated diaphragms; boxes for medicated soaps lined with paraffin; boxes for eye-solutions, holding one ounce bottle and pipette, are very attractive and convenient. Collapsible tubes of all sizes for ointments, with cartons to fit each size—necessary because the tube cannot be labeled; ointment jars with metallic caps and ointment jars with glass tops; special amber glass top jars for ointments of mercuric oxide, etc. Containers are indeed a study, and interesting papers could be written upon the subject.

DISPENSING NOTES.—How prescriptions should be received, numbered, dated and filed, and what recording notes should be made.

Every well equipped pharmacy should be supplied with a good steel numbering machine that will triplicate. These triplicating machines have to be made especially, but cost little more than the usual ones. There should also be provided order blanks and blank checks of a convenient form; these can be used as a means of advertising, if desired.

Orders are easily divided into three classes: "Waits," "Calls" and "Send-outs." If the prescription is on a "wait," its hould be numbered by the machine, the order slip should receive the same number, as also should the check given the customer. The order slip is simply marked "wait" if the party is unknown, and the name and "wait" if known. This same procedure is gone through with for a "call," excepting this term is substituted for "wait" and the time of calling added, if this can be ascertained. Of course, if paid for, this fact should be indicated. When these are delivered it will be necessary to mark them either paid or charged, as the case may be. The "send-out" order slip should receive, of course, name and address and should be marked paid, charge or collect. It

should receive one number from the machine, the prescription one, and the third should be placed on a book where a memoranda of all "send-outs" should be made; otherwise they might be overlooked. This book should show time of required delivery. The number of a repeat can be put on check with a pencil. The prescriptions and order slip should be dated before the label is written with one of the small rubber dating stamps so easily obtained. It will be found much better to write the abbreviation for the month than to use the conventional numerals, which are not so well understood by the laity and are much more apt to be made in error. One month is seldom if ever written for another, but one number is easily made when another should be used. Every pharmacist of any experience has been annoyed by duplicate numbers and by "skips;" frequently serious errors have occurred. A well made machine will prevent all this, if it is not used to number the labels, which look much better numbered with a pen and will bear the proper figures if the checking is carefully done. The order slips are a most ready and convenient means of charging sales; in this regard they will many times save their cost and the value of time consumed in filling them out. They can be posted directly to ledger or copied in day-book; each day should be wrapped in paper bands, marked and the packages of the several months should be bundled. They record receiver, compounder, and might be made to indicate who delivered package. Each slip should show list of other goods to be delivered with prescriptions and one, indeed, should be used for every sale.

The checks, besides insuring the delivery of the proper prescription, save worlds of embarassment, invariably following the asking of names, which in many cases the customer dislikes to give.

Notes regarding the peculiarities of the prescription or the mode of preparation, should always be made upon the prescription itself. These notes, when necessary, should by all means appear. The filing of prescriptions is largely of individual preference and is much influenced by the space at hand. No plan, however, seems to take the place of the large invoice book into which they are to be pasted.

Checking Prescriptions.—This should be done in all cases where it is possible. It takes time, 'tis true, but it is not only a safeguard to the patient, but also guards one's business and is a relief and comfort to the conscientious dispenser that is indescribable.

The label should be written first, no matter by whom; the prescription and label should be checked before the prescription is compounded, then the label should be attached to the container by the dispenser the moment the prescription is finished. The label and prescription should then be checked again. This, however, is all useless, unless a lot of wooden trays are at hand—8 inches by 12 inches by 2 inches deep, is a convenient size. Into such a tray must be placed every article used by the dispenser, the prescription and the labeled package and all handed to checker, who will certainly discover a misused drug. This tray system will work much more easily and satisfactorily than may at first appear.

Absorbent cotton, almost indispensable to the dispensing department, is scarcely more useful than is the absorbent sterile gauze prepared for surgical dressings. Any number of uses will be found for this, and it always offers a perfectly clean towel not often otherwise obtainable. The finer quality is preferable, and if kept in a box or drawer with a pair of shears handy it will be very serviceable; the cost is small. It is especially useful as a coarse strainer, for drying vessels, for wiping off capsules, etc. Once used it is, of course, thrown away.

Collapsible tubes can be quickly and nicely filled with ointments, which must not be fused, by placing the ointment on a piece of parchment paper which has been wet and from which the adhering water has been wiped. A long slim package should be made, as near the shape of the tube as possible, only smaller; the usual wrapping fold should be made in the paper. One open end of this package should be introduced into the

tube, to the shoulder. The exposed end of the package should now be constricted and the ointment "stripped" out between the thumb and finger, filling the tube from the shoulder; meanwhile the paper should be drawn out as the tube fills. A pair of forceps, made for the purpose, are very desirable for sealing collapsible tubes. Metallic containers when used for ointments of mercurials, silver salts, etc., should be coated with a resin. An ethereal solution of tolu will be found very satisfactory and a convenient acquisition to the dispensing department.

Percentage solutions are now comparatively common prescriptions. Pharmacists should be quite sure they fully understand the quantities required to make the percentage called for. It has been observed by members of this committee that the methods often used, give weaker solutions than intended; especially is this the case with those of higher percentages. The fact that the substance dissolved goes to make up a part of the total weight should not be overlooked, as is often the case. 45.5 grains added to one fluidounce of water does not make a 10-per-cent. solution. But 50 grains to 450 grains of water does—and this will make very nearly one fluidounce of the solution.

Filtration of Solutions.—Where first-class filters are not to be had and good filtration is required, a pledget of absorbent cotton, in the neck of the funnel, in connection with the paper filter, will be found effective. Especially useful for eye solutions.

Eye solutions of small amounts of fluid and of delicate alkaloids should be made by washing the bottle with filtered water,—shaking out all adhering drops—placing salt in bottle and adding sufficient filtered water.

Konseals can be handled to best advantage in a regular apparatus. Not too much moisture and liberal pressure are the rules to follow. A convenient mould for gelatin lozenges can be made by placing the hinged portions of the konseal machine flat on a piece of glass. The moulds thus made can be evenly filled with the melted gelatin base, properly medicated and adjusted. When cool the lozenges can be pushed through or out with no difficulty. Different size lozenges can be made with this improvised mould. A good base is made by using one avoirdupois ounce of French gelatin and one fluidounce each of glycerin and water.

Gelatin bases for lozenges and suppositories can be made by dissolving the gelatin in hot water at once. It is not necessary to allow it to "soak," as is generally directed; provided the French Gold Medal product is used.

Compressed tablets can be made in a smaller way quite quickly if the proper compressing machine is at hand. The small compressors used with a mallet are not worthy a place in our stores. It is not at all necessary to granulate the substances to be compressed if the machine is fed by hand. Indeed, in almost every instance better results can be obtained when a very fine powder is used than otherwise, Often when a substance will not adhere at all, in coarse powder, tablets can be easily made if fine powder is used.

Alkaloids, as such, are often soluble in fixed oils. This fact should not be overlooked, and when a salt of an alkaloid is prescribed in oily solution a proportionate amount of the uncombined substance should be substituted.

Spray Fluids should be dispensed as perfect and permanent solutions if it is possible to do so. As these are invariably expected to be in an atomizable condition, it is thought that slight alteration of this class of prescriptions is allowable. Small or additional quantities of potassium iodide, glycerin, alcohol, alkali or acid cannot be objected to, if used with due consideration for their medicinal effect.

Waxed paper can be used to great advantage in dispensing many powders and powdered substances. When used, the packages should also be wrapped in the usual white paper, since the waxed paper is unsightly.

An irrigating bottle of 2 gallon capacity, placed upon a shelf just above the level of the average eye, if fitted with a short rubber tube, a burette pinch-cock and a glass tube

nozzle, will be found to be a most convenient holder for dispensing water. The amount required can be very quickly and accurately drawn by holding graduate on a line with the eye.

CONCLUSION.

These notes, homely, perhaps, have not been offered by the Committee as being in any way scientific, as science is generally understood; nor is it claimed that they are representative or that the collection is by any means as large as should appear hereafter. They are simply intended to show a line of work which we believe would be profitable to a large number of the Association's members. Whether or not they are of a kind that is helpful and are sufficiently new to be attractive should be fairly discussed by this body, and if such a committee is to be continued it should have the support and counsel of the Association. In any event, it is only fair to remember that our trials have been the trials of the pioneers, and the same fairness will look for no more than crude results.

Not from without but from within, does pharmacy to-day need help; help not so much of the scientific sort, but of a kind that is plain; that is practical; that can be used in the modern drug store, and make it in kind, and, to a degree at least, what the larger manufacturer is. Establish principles, principles so well formed and so well laid that no superstructure built upon such a foundation shall fail. Theories too, but easily convertible theories, to be readily applied to daily needs. Much pharmaceutical testing is above our heads and we need beyond all things else practical tests. So much pharmaceutical writing is even more heavenward. There is need for easily and quickly applied means for testing our purchases. Pharmacists should give more time and pains to the department of buying. Yet, withal, conscience and desire are to be our greatest helps.

Patient inquiry and personal experience confirm the belief that pharmacists of a class that is creditable to the profession are to-day largely manufacturing their galenicals. It is possible to prove, omitting extracts and fluid extracts, representative members of this Association actively engaged in the retail business are preparing all preparations of the Pharmacopeia used in sufficient quantities to pay, excepting perhaps four or five, viz.: Spirit of nitrous ether, spirit of ammonia, solution of iron chloride, solution of lead subacetate and mercurial ointment. If this be so, and there is still much manipulation required at the prescription counter, the times and conditions plainly point to the necessity for ample facilities and sufficient equipment. To justly judge as to the extent and limit of such requirements, one must look beyond his own narrow bounds and the possibilities of his environment, and scan the larger field of possibility—the one into which ambition or desire may lead him.

In closing this report we trust it has been shown that there is yet dispensing to do, that there are still preparations to be made, and hope that through our efforts some little something has come to help the dispenser, the practical pharmacist. All of which we respectfully submit, while justly appreciating the honor done us.

For the Committee, HENRY P. HYNSON,
Chairman.

Prolonged applause followed the reading of the report.

Dr. Lowe moved that the report be received for discussion and incorporation in the Proceedings, and that a most hearty vote of thanks be returned to the committee for its most excellent work. The motion was seconded by Mr. Hallberg, and carried unanimously.

MR. HYNSON: I have here some papers which I will read by title, and you can make such disposition of them as you see fit. Some are short and some are long. With the permission of the Association, I will read one paper which I think will be of interest. It

is a paper which I think should be a typical one, and one that I can read in a few minutes. It is upon the subject of "Elastic Capsules," and is written by Mr. Preissler, of Kentucky.

Permission was granted, and Mr. Hynson read the paper as follows:

HOW TO FILL ELASTIC CAPSULES.

BY H. W. PREISSLER, SHELBYVILLE, KY.

The elastic capsules have become quite a fad with some physicians, and with a good many of them in this locality. The filling of them is a tedious job, but with proper appliances and a little patience it becomes quite easy. Where many of them are filled at one time it is necessary to have ready the perforated boards, droppers, funnels, the water-bath for the gelatin, and other apparatus which is at hand with the ordinarily watchful pharmacist. My perforated boards are made of strips of yellow poplar, 20 inches long, $1\frac{1}{2}$ inches wide and $\frac{3}{8}$ inch thick, with 25 holes at equal distances apart, bored with a $\frac{7}{16}$ inch bit (for 10 min. capsules). Bore the holes entirely through against a piece of plank so as to make a clean cut; smooth off with sand paper and put on a bottom of cardboard or thin pine or poplar. I have eight of these, besides other smaller ones for prescription work. In this way 400 or 500 capsules can be made at one time.

In filling the capsules with liquids I use an ordinary medical dropper, on which is a mark showing the required quantity of liquid for each capsule. Where powders or solids are used with liquids, first weigh or divide into the proper doses and introduce with the aid of a small paper funnel or ear speculum, then with the dropper add the liquid. The neck should be cut close to the body of the capsule and placed firmly in the perforated board, then proceed to fill as above.

In the meantime the necks which were cut off the capsules are melted on a water-bath, adding a little water (about fℨj. to 50 or 60 necks), and drop of the liquid gelatin placed upon the opening of the capsule with a small wooden paddle. This makes a cleaner closure than by cutting the neck long and melting down with a hot iron. The iron, when too hot, is apt to discolor the gelatin, making unsightly capsules.

In keeping the capsules in stock, it is better to have perforated boards about 6 x 10 in. to hold fifty or seventy-five capsules, whereby they retain their shape, and are less liable to collapse.

On motion of Mr. Mayo, the papers presented to the committee and read by title by Mr. Hynson, were ordered to be referred to the Committee on Publication, with power to act.

Mr. Sheppard said he had received a letter from Dr. Charles Rice, in which the latter sent friendly greetings to the members of the Association, assuring them of his continued deep interest in their work and expressing the hope that ere very long he may be able again to join them.

THE PRESIDENT: We are glad to hear from Dr. Rice at any time. He has been a very valuable member of the Association in more senses than one.

The General Secretary suggested that, inasmuch as it appeared that the Commercial Section would probably not use the evening hour set apart for its second session, that time be allotted to the Scientific Section for its first session, if not utilized by the Commercial Section, particularly as there was to be a reading by Prof. Lloyd to-morrow evening, the time set for one of the sessions of the Scientific Section.

Mr. Sheppard seconded the motion and it prevailed,

Upon motion, the Association then adjourned.

Papers presented to the Committee on Practical Pharmacy and Dispensing read by title.

A PRACTICAL METHOD FOR THE MODIFICATION OF COW'S MILK AS A SUBSTITUTE FEEDING FOR INFANTS, FOR THE USE OF DRUGGISTS.

BY MARY STEELE EWING, PH. G., BOSTON, MASS.

During the past few years much attention has been given by the medical profession to the modification of cow's milk for a substitute feeding for infants. In some of the larger cities, laboratories have been established where this is done on a large scale and with success. The physicians of the smaller cities and towns have been unable thus far to prescribe modified milk for their patients, because they could not obtain it.

It has occurred to me that the druggist might take up this work with satisfaction to the physician and some profit to himself. As apothecary to a large hospital for contagious diseases, it has been my duty to formulate a scheme whereby modified milk can be produced on the premises at short notice and at moderate cost. We have had to modify milk for from one to eighteen patients daily, and the following plan has been entirely satisfactory both to myself and the physicians. I know of no reason why the work done here cannot be done by any careful druggist in his own store, with comparatively little expenditure of time. The apparatus is simple and inexpensive and but little space is required.

The following scheme has been in operation at the hospital for more than three years, and is as follows:

First, we should use the milk from the mixed herd, and should be certain of the absence of tuberculosis in the herd. By the term "mixed herd" we refer to the fact of the individual cows of the herd having calved at different periods, thus making the milk of the entire herd of no particular age from time of calving. All authorities agree in preferring the milk of the domestic breeds, as Durham, Holstein, Ayrshire, to the fancier stock, as Jersey or Guernsey, as they are hardier, have greater constitutional vigor, are not so nervous, and consequently there is less liability to sudden fluctuations in the percentage of fat and proteids. The percentage of sugar and ash is said to be most constant under all conditions in each individual cow.

We must now become acquainted with the terms:

Whole milk—which is the milk before any cream has been removed.

Top milk—which is the top one-fourth of the whole milk.

Milk—or the three-fourths left after the top milk has been decanted.

The top one-fourth of a milk of a mixed herd, say from forty cows of mixed breed, will assay about 10 per cent. fat. This is the one thing which should be carefully watched, and should be determined at stated periods, at least twice during the season, or at any time that the whole milk has the appearance of being deficient in fat. In cold weather the top milk will be heavier than during the heated term, but this does not necessarily mean that it contains more fat. The determination of fat present is very simple, and there are many methods recommended, but the one known as the Adams Method is the one I personally prefer. It consists in running from a pipette 5 Cc. of the milk to be tested into a 2-inch porcelain capsule and weighing. A strip of filter paper about 1½ inches wide is then rolled into a coil, secured near one end with a piece of thread, the other end dropped into the capsule. With a little dexterity, nearly all the milk will be absorbed by the filter paper. The coil should now be placed—dry end down—on a glass slab, and put in a water oven to dry. The capsule is again weighed, and the weight of the

milk absorbed is found by the difference. The paper should be left in the oven until it is dry, which will be about an hour, then inserted in the chamber of a Soxhlet continuous extraction apparatus. This is a simple glass tube about the calibre of an ordinary sized Liebig condenser, with two side tubes. One end of the Soxhlet is inserted in a tared flask, having a capacity of about 150 Cc., and containing about 75 Cc. of anhydrous ether; the other end is connected with a Liebig condenser, and all placed on a water bath. The side tubes are so arranged that when the chamber of the Soxlet in which the paper is soaking has become filled to a certain point with the distilled ether, it will empty itself automatically through one of the tubes into the tared flask. Then the ether, which boils at 37° C., is again volatilized, condensed, and received in the chamber of the Soxhlet. After the paper has received ten or twelve washings, the flask is detached, the ether evaporated or removed by distillation, and the fat, which is now in the tared flask, dried by heating at 100° C. The flask should be allowed to cool, then weighed, and the calculation made. You will see that this will take but a short time, as the Soxhlet is self-acting, and need not be closely watched, and I usually evaporate the ether, as the time is of more moment than the price of the 75 Cc. ether. This is the only estimation which it is absolutely necessary to make.

In round numbers a good cows' milk, taken from a mixed herd, will assay:

Fat	4.00	per cent.
Sugar	4.50	"
Proteids	4.00	"
Ash, about	.65	"
Total solids	13.15	"
Water	86.85	"

The term proteids is a little more comprehensive than the old one, albuminoids, and comprises albumin, casein and globulin. In the ash are found the salts of sodium, potassium, magnesium, calcium, and a minute amount of phosphorus and iron.

Normal human milk will assay about:

Fat	4.00	per cent.
Sugar	7.00	"
Proteids	1.50	"
Ash, about	.15	"
Total solids	12.65	"
Water	87.35	"

It will be seen that the percentage of fat present in cow's milk and human milk is the same; that the sugar in human milk is increased by 2.5 per cent., and the proteids diminished 2.50 per cent.

Milk which has just left the udder is neutral, but on standing, it readily becomes acid, so we add 5 per cent. lime water in each case to each recipe, unless more or less is called for by the physician.

Since it is easier to calculate with a multiple of 10, we will make up 20 ounces, as this is an amount often called for, and increase or diminish it fractionally, according to the amount ordered in the prescription.

We must have on hand—

1st. Top milk, which is ¼ of the milk set (or whatever part of this we have found assayed 10 per cent. fat).

2d. Recently boiled water.

3d. Lime water.

4th. Milk, being the bottom $\frac{3}{4}$ after the top $\frac{1}{4}$ has been decanted.

5th. Milk sugar.

It is evident that if we use cream containing 10 per cent. fat, each ounce of cream in a twenty ounce mixture will give to the entire mixture $\frac{1}{2}$ per cent. fat, for $\frac{1}{20}$ of 10 per cent. is $\frac{1}{2}$ per cent.

In the same way we calculate the proteids; $\frac{1}{20}$ of 4 per cent. which would be .2 per cent. proteids in one ounce of milk and cream, or it would take five ounces of milk and cream together to get 1 per cent. proteids.

In calculating the sugar we must allow for the 4 per cent. already in the milk and cream.

For example: If we have normal cow's milk which assays

Fat	4.00 per cent.
Sugar	4.50 per cent.
Proteids	4.00 per cent.

and wish to make of it a 20-ounce mixture corresponding to normal human milk, which assays

Fat	4.00 per cent.
Sugar	7.00 per cent.
Proteids	1.50 per cent.

since there is $\frac{1}{2}$ per cent. fat in each ounce of top milk, we will require:

Top milk	8 ozs.
Milk	none.
Lime water	1 oz.
Water	11 ozs.
Milk sugar	500 grs.

As the 1.5 per cent. proteids will be in the eight ounces of top milk used, this recipe will require no extra milk.

The sugar will be calculated in this way:

We already have 8 ounces top milk, which, as cow's milk assays 4.50 per cent. sugar, will contain 172 grs.; we want 7 per cent. or 672 grs., then we will add the difference, which will be 500 grs.

The milk sugar should be rubbed up with the milk, as it is more soluble in it than in the water.

Another example, to make—

Fat	3.00 per cent.
Sugar	6.00 per cent.
Proteids	2.00 per cent.

4 oz., 8 feedings.

On the 20 oz. basis this will require—

Top milk	6 ozs.
Milk	4 ozs.
Lime water	1 oz.
Water	9 ozs.
Milk sugar	447 grs.

For 32 ounces we will use $\frac{32}{20}$ or $\frac{8}{5}$ of this amount, which will be—

Top milk	$9\frac{3}{5}$ ozs.
Milk	$6\frac{2}{5}$ z s.
Lime water	$1\frac{3}{5}$ ozs.
Water	$14\frac{2}{5}$ ozs.
Total	32 ozs.

Milk sugar, 715 grs.

Sufficient milk for each feeding should be put in wide-mouthed, round-bottomed, shoulderless glass bottles, placed in a basket, stoppled with non-absorbent cotton, and sterilized by heating at a temperature of 75° C., or 167° F., during twenty minutes.

Upon removing them from the sterilizer, they should be drained and thoroughly cooled before sending out. The advantage of these bottles over ordinary medicine bottles is, that they are more easily cleaned, as a bristle bottle-brush may be circulated through one touching every part. 4 and 8 oz. bottles will be required. The basket to hold them must be according as your fancy dictates. As they are to be set in the water-bath, the best basket would be one of willow, with perpendicular sides and reinforced like a champagne hamper. It should be about 6 inches wide, 6 inches high and 10 or 15 inches long, according as it is intended to hold eight or twelve bottles, with a partition lengthwise, so that it may be two bottles deep, strips across, as the bottles will not stand alone, and a handle. For a sterilizer or water-bath, a copper box with a lid is best, as it will not rust, and may be of whatever dimensions you prefer, or, according to your space. It should rest on an iron frame, and a Fletcher gas stove is the best means for heating.

The sterilizer should contain just enough water not to float the bottles, and the water can remain in the sterilizer from day to day, being replenished only as it evaporates.

The cold milk will lower the temperature of the bath, so it is a good plan to have it a little higher than 75° C., according to the number of bottles to be sterilized. Place the baskets in the bath and take the temperature again after five minutes. If it is now 75° C., put on the cover and turn off the gas. If the box is tight, the bath will practically remain at this temperature the required time. The milk should not be raised to a much higher temperature, as the lime will be precipitated.

The object of stoppling the bottles with cotton wool, is first, to keep out the bacteria and dust; and second, in order that the air may circulate freely through the milk. You should insist upon each bottle being rinsed after using, first with cold water, then with hot, and turned mouth down in the basket, as the bacteria in the air fall—they do not rise—and the bottles, when they are returned to you, will be practically clean. The rubber nipple can be placed over the mouth of these bottles, thus doing away with an extra feeding bottle.

As to the expense of the plant, in addition to graduates, a thermometer, a small Liebig condenser and a Fletcher stove, which you will have in use in the store, you will need: milk bottles, baskets, copper water-bath, cast-iron stand and a Soxhlet continuous extraction apparatus.

The milk tubes can be bought of Whitall, Tatum & Co., for about 50 cents a dozen, according to number; the baskets will probably cost 75 cents apiece; the copper sterilizer and stand, $25.00; Soxhlet and incidentals, $5.00. I should count on $50.00 for the plant.

As to the formation of the prescription; that, of course, is in the hands of the physician and is from his standpoint; however, I will say that the percentage of fat, sugar, proteids and amount, should be regulated rather by the weight of the child than by its age.

The doctors here at the hospital have a way of starting with a very low percentage of fat and proteids and increasing it every few days until they have arrived at a formula which will correspond to the child's age and improved condition.

Milk sugar has generally been considered an important adjunct in the modifying of cow's milk. During our first year we decided to experiment with cane sugar, as it is nicer to use from a mechanical standpoint and is cheaper. As cane sugar is much sweeter than milk sugar, we decided to add one-half the amount required in the recipe. The infants were carefully watched, and there was no apparent change in their condition We still continue to substitute cane sugar, unless an infant does not seem to thrive upon the milk, when the physician will order a decrease in the percentage of fat and proteids, and as a precautionary measure, milk sugar.

In calculating the amount to use, we divide the amount of sugar called for in the prescription by two, and point two places. Supposing we want to add sugar 580 grs. we will use 2.9 oz. of the sugar solution, deducting, of course, this amount of fluid from the amount of water to be added to the original prescription. During the heated term this solution should be kept in the ice-chest; the amount of sugar present being so small, it will soon ferment.

It might be a good plan, if all recipes, say of 2.5 per cent. fat, 6 per cent. sugar and 1 per cent. proteids or under, should be sweetened with milk sugar, and all of over these amounts with cane sugar, unless otherwise specified by the physician.

In the laboratories the fat is separated from the milk by means of a centrifugal machine. Then the different amounts of the various ingredients called for in the prescription are measured or weighed out, the bulk made up with water and all shaken together. The question has been raised whether the fat globules so separated (which cannot be so finely divided as in the fat which separates itself by gravity) are as readily digested: this, as we have never used a separator, I am unable to say, but when we put in our plant four years ago I made some physical tests, with these results:

I procured samples of modified milk made from the separated fat, on six successive days, and compared each with that made from the 10 per cent. top milk. The first day, in most instances, they had about the same physical and microscopical appearances, but after that, the oil globules in the milk made from artificially separated fat, presented under the microscope irregularities both in form and size, while in the milk in which naturally separated fat was used, the globules remained small, round and of uniform size.

In the laboratory sample the fat, as it rose to the top, seemed to coagulate around a pellicle in the centre of the surface of the milk and did not break up on being shaken; while in the sample made from gravity separated fat, the fat was evenly divided over the surface, and upon shaking, broke up in a natural manner. When the two samples were warmed, the artificially separated fat floated in large globules on the surface of the milk, very much resembling large oil globules on chicken broth; while in the one naturally separated, they remained small, round and uniform in size, presenting about the same appearance as they did when examined microscopically.

Dr. C. W. Townsend, of Boston, in an article on Modified Milk in the "Boston Medical and Surgical Journal," of March 23, 1899, asserts, that while in the majority of cases the modified milk made from artificially separated fat agrees with infants, he has found isolated cases where it has not agreed, and on changing to gravity milk, made after the same formula, the child has thrived.

From this we may conclude that, whereas modified milk made from gravity separated fat may not be so scientifically correct in its composition, yet from the fact that the fat is more minutely subdivided by the natural breaking up of the emulsion, we should judge that it would be more easily digested, and if the strength of the milk is conscientiously watched, it is fully as desirable as modified milk made from artificially separated fat, for the composition of which a great deal of expensive apparatus is required.

If there should be any one who is influenced through reading this article, to put in a modified milk plant after this style, and I can be of further service, it will give me pleasure.

NOTES AND SUGGESTIONS.

BY E. G. EBERLE, DALLAS, TEX.

Unguentum Aquæ Rosæ, 1890.—The formula adopted has gained an advantage by the addition of sodium borate; it has at the same time added disadvantages through the latter. My method for some time past has been the formula of the United States Pharmacopœia without the borax, and using benzoinated oil of sweet almonds in lieu of plain oil of sweet almonds. I find that the ointment keeps much better and the slight odor of benzoin is not objectionable. I also change the quantity of stronger rose water from 190 Cc. to 200 Cc. I use an egg-beater to stir the ointment. For some time I have been benzoinating purified cottonseed oil for various pharmaceutical purposes. I concluded to try the latter in making cold cream, and find no disadvantages in this change. I think purified cotton-seed oil can be used in every instance where other bland oils are now used, and while it possibly has no advantages over these, excepting cost, it has, to my knowledge, no disadvantages. Again, while my experimentation has not gone far enough, and having had no opportunity to hear objections regarding the benzoinating of oils of this character to retard rancidity, my experience so far has been favorable. For the purposes above quoted, I carefully select the benzoin and benzoinate the oil by long contact instead of heat. I also benzoinate lard with benzoinated cotton-seed oil, using low heat in that instance, and then adding this strongly benzoinated oil to the lard, to which a sufficient amount of wax has been added to bring about the desired consistence.

Citrine Ointment.—I use instead of lard oil a mixture of equal parts of cotton-seed oil and lard, following otherwise the directions of the Pharmacopœia. The resultant ointment gives good satisfaction, both as to color and consistency. Although this basis may not be a very scientific one, it gives, as I have stated, good results. Cotton-seed meal is a good substitute for flaxseed meal as a poultice. I find that absorbent cotton of the market is not made of the better staple.

I am strongly in favor of admitting some of the acetic fluid extracts. My experience with a few of those written fully about by others has been very gratifying. I would, however, suggest their introduction under another title in order to avoid reasonable excuse for substituting one for the other and possible error of the physician specifying the desired product. Experience would then speak in favor of one or the other, leaving a future revision to reject them or adopt others. For instance, the name Extract. Nuc. Vom. Liquid. Acetic. would make it a distinctive preparation, the merits of which a progressive physician would investigate, but used in his prescription in lieu of a specified fluid extract, would create, to say the least, an annoyance. In other words, I do not think Acetic Extracts should be denominated Fluid Extracts, but Liquid Acetic Extracts, or given some other distinctive appellation.

I am also in favor of a 50 per cent. tincture, based upon a determined standard, and discard all fluid extracts and tinctures. To do this at once would be too radical a change, and, therefore, would hardly recommend it for the coming revision. I believe that it would result in the pharmacist making his own preparations instead of the large manufacturer. The pharmacist—I am speaking now of the average druggist—has become so imbued with the idea that he can not make Fluid Extracts, that he scarcely ever attempts it; too many even reduce these Fluid Extracts to make tinctures; those who do not, however, will readily fall into line and make their own 50 per cent. tinctures, as they have always made their tinctures, and thus we will accomplish a double purpose.

The National Formulary affords a ready means to experiment on these two latter classes, and possibly the best means whereby to try their merits.

SOME PRESCRIPTION INCOMPATIBILITIES.

BY GEO. L. BURROUGHS AND H. L. SIMPSON, BOSTON, MASS.

From time to time articles and items appear in our pharmaceutical journals regarding incompatibilities in certain given prescriptions. In many cases statements are made concerning the cause of faultiness which do not appear probable to one versed in chemical reactions, yet such pass unchallenged because, perhaps, it is the duty of nobody in particular either to acquiesce in or to contradict them. Sometimes different writers do not agree regarding the same prescription, and then it is left to the reader to decide between them. Were the readers competent to make a decision, the writers would be chary of making any careless or unsound statements; but unfortunately the subject is the most eagerly perused by the beginners in pharmacy, or by those whose chemical education is meagre or even entirely lacking, and these are the readers who stand most in awe of an author and think not of questioning his statements. And even the wisest of readers will frequently hesitate to challenge a statement without personal experiment to ascertain the facts by observation, even though there be a doubt in the mind. And so the original dictum passes for a fact, is copied from journal to journal, repeated by subsequent writers, and ultimately finds its way into our text-books to be the more widely promulgated.

It is for these reasons that the following experiments were performed. No attempt has been made to cover the field or any portion of it in a systematic way, though particular attention has been paid to the iron and mercury salts. Many of the prescriptions which follow were taken from our journals during the winter, and some are prescriptions which have long been accepted without question.

In all cases the prescriptions were compounded as written, usually in a variety of ways, and were then set aside for observation during periods of from two weeks to six months. Particular care was taken to use materials of standard quality, and to discriminate between incompatibilities due to common impurities in the chemicals or preparations employed, and those which were due to the combination directed. Careful watch was kept of the mixtures, and precipitates which formed were examined whenever this was deemed advisable.

Inasmuch as the term incompatible is generally understood to refer to those changes which result in unsightly or unpleasant mixtures, to marked changes in color or appearance, or which materially affect the therapeutic effects of the mixtures, any other changes in the mixtures were disregarded.

It is not presumed that the following comments will be accepted as final, and they are here offered only as the results of careful observation upon experiments impartially performed.

℞

Aloin	gr. ij.
Podophyllin	gr. ss.
Hydrarg. Chlor. Mitis	gr. v.
Pulv. Saponis	q. s.

M. ft. pil. no. 1.

Attention was here called to a reaction between the soap and the calomel, resulting in the formation of black oxide of mercury by reason of an excess of alkali in the soap. This will depend chiefly upon the presence of an excess of alkali in the soap, though a neutral soap may give a like result by reason of its decomposition by water.

Several pills were made with calomel and a neutral soap, water being used as an excipient. These remained white for a week, then a slight change in color was noticed, and at the end of two weeks the pills were gray. From a prescription standpoint the incompatibility does not appear important.

℞
Hydrarg. Chlor. Mitis ..... gr. iij.
Ammonii Carbonatis ..... gr. v.
Sacchari Lactis ..... gr. v.
Misce et fiat pulvis no. 1.

Ammonium carbonate changes calomel to the dark mercuro-ammonium chloride, and when the two are triturated together, or are mixed in the presence of water, this change occurs immediately. But sugar of milk delays the reaction for a considerable time if the powders remain dry.

The prescription was compounded by triturating the calomel with the sugar of milk, then mixing the ammonium carbonate, previously powdered, lightly but thoroughly. So compounded the powders showed no change during three weeks.

℞ Hydrargyri Chlor. Mitis 1.0
Sodii Bicarbonatis 9.0

It has been claimed that the calomel in the above mixture will be changed, wholly or in part, to mercuric chloride, in from four to six weeks. Soluble carbonates precipitate mercurous carbonate from solutions of mercurous salts, and calomel when heated with sodium carbonate is reduced to metallic mercury.

100 grams of the above mixture was made by thorough trituration, using a calomel which was ascertained by tests to be free from mercuric chloride, and a bicarbonate which contained, as do all commercial samples, traces of chloride and of carbonate. The mixture was made on Dec. 13, 1898, and was tested Dec. 28 and 30, 1898, Jan. 2d, 6th, 9th, 13th, 15th, 17th and 23d, Feb. 8th and March 15th, 1899. A portion of the powder was shaken thoroughly during ten minutes in absolute alcohol, the liquid filtered, and to different portions of the filtrate were added test solutions of ammonium sulphide, silver nitrate, hydrogen sulphide, soda, and stannous chloride. No reaction was evident in any case.

Some tablets of calomel and sodium bicarbonate which were known to be more than a year old were tested in the same manner, but failed to give any evidence of the presence of mercuric chloride.

When the mixture was shaken with water, filtered, and the acidulated filtrate tested with silver nitrate solution, a white precipitate, soluble in ammonia water, was obtained, indicating the presence of a soluble chloride. It is probable that this reaction gave rise to the statement made that mercuric chloride is formed, the almost universal presence of chloride as an impurity in soda and potassium salts being overlooked.

℞ Hydrarg. Chlor. Mitis 1.0
Sacchari Albi 9.0
M. Ft. pulv.

℞ Hydrarg. Chlor. Mitis 1.0
Sacchari Lactis 9.0
M. Ft. pulv.

The statement has been made that corrosive sublimate is formed on standing in both the above mixtures, but repeated tests during a period of more than two months failed to verify it. The tests were performed in the same manner as in the calomel-bicarbonate mixture.

℞ Hydrarg. Chlorid. Corros. ..... gr. xvi.
Collodion ..... ℥ ss.
Misce et fiat. solut.

The corrosive sublimate dissolves very slowly in the collodion, requiring more than nine hours, in the instance tried, when the powdered salt was shaken in it. It was quickly prepared by dissolving the salt in half a drachm of boiling alcohol, which solution was then added to the collodion.

℞ Hydrarg. Bichloridi ..... gr. i.
Liq. Hydrarg. et Arsenii Iodidi ..... Min. lxxx.
Aquae Destillat ..... ad ℥ ij.
M. Ft. solut.

On dissolving the bichloride in the water and adding the Donovan's Solution, an insoluble precipitate of mercuric iodide was formed. This was prevented in a subsequent trial by adding 10 grains of potassium iodide to the aqueous solution before mixing, a clear colorless solution then resulting.

℞ Ung. Hydrarg Oxid. Flav., 5 per cent. ..... ℥ ss.
Sig: Use in the eye.

℞ Ung. Hydrarg. Oxid. Rub., 2 per cent. ..... ℥ ss.
Sig: Use in the eye.

It is commonly taught that the use of steel spatulas must be scrupulously avoided in preparing these ointments to prevent a reduction of the mercury salts. It has also been stated that the ointments prepared by contact with metals are more irritating when applied to the eyes.

Each prescription was compounded on a slab, using first a steel spatula and on another lot a horn spatula. The four lots were then allowed to stand 48 hours, then tried upon the eyes, several persons volunteering to make the applications. No difference was noticeable between the ointments made with steel and those made with horn spatulas, nor was there any difference in color to be observed after standing two weeks. Doubtless in the presence of water the salts are likely to be reduced, but in its absence there appears to be no difference. Combinations of alkaloids with halogen salts are common in prescriptions. Such are combinations of quinine or tincture of cinchona with iodides, of strychnine with bromides, etc.

Alcohol has been recommended to overcome these incompatibilities, or syrup to suspend the precipitates. A number of experiments were made to ascertain the most desirable method of exhibiting these combinations.

Six mixtures were made, all containing 1 grain of strychnine in two fluid ounces of mixture, with potassium bromide, and alcohol, mucilage, syrup, glycerin or acid respectively to ascertain their effects.

The composition of these mixtures is shown in the following:

	A	B	C	D	E	F
Strychnine	1 grain	1 grain	1 grain	1 grain	1 grain	1 grain
Potassium bromide ..	2 drachms	3 drachms	2 drachms	3 drachms	3 drachms	3drachms
Alcohol	1 ounce	4 drachms				
Mucil. acacia	.....	.....	.....	½ ounce		
Syrup	.....	.....	.....	.....	1 ounce	
Glycerin	.....	.....	.....	.....	.....	1 ounce
Dil. sulph. acid	.....	.....	10 drops			
Water, s. q. to make .	2 ounces	2 ounces	2 ounces	2 ounces	2 ounces	2 ounces

Mixtures A and B remained clear for about 24 hours, then a fine precipitate appeared which gradually increased in quantity and adhered obstinately to the sides of the bottle,

so that it could not be diffused evenly. Mixture C precipitated immediately in a fine semi-flocculent condition. Mixture D produced a fine adhesive precipitate, which would not diffuse well on shaking. Mixture E remained clear about a week, then a very light and fine precipitate became noticeable, which remained suspended. Mixture F acted in the same manner as E, but the precipitate appeared earlier, and settled appreciably on standing 24 hours.

All these experiments were repeated, some several times, and always with the same results. Alcohol was deceptive in that it yielded a clear solution at first, but after 24 hours the precipitation appeared in a very troublesome condition. Mucilage failed to suspend the insoluble matter well. Glycerin and syrup to the extent of 50 per cent. by volume both yielded very satisfactory products, the syrup being a little more desirable of the two, from a pharmaceutical stand-point.

Mixtures were then made of quinine with potassinm bromide as follows:

	A	B	C	D	E	F	G
Quinine sulphate	5 grains	10 grains	5 grains	5 grains			
Quinine bi-sulphate	.....	.....	.....	.....	½ drachm		
Potassium bromide	1 drachm	2 drachms	1 drachm	2 drachms	1 drachm	3 drachms	2drachms
Alcohol	6 drachms	12drachms	6 drachms				
Dil. sulphuric acid	.....	.....	.....	10 drops			
Water	6 drachms	4 drachms	2 drachms	2 ounces	1 ounce	.....	1 ounce
Tinct. cinchona	.....	.....	.....	.....	.....	2 ounces	1 ounce

In mixtures A, B and C, precipitates formed almost immediately. These were mixed in all possible ways, but the results were essentially the same. In some cases the precipitate formed immediately, in others after a few moments, but in all cases quickly. With F and G better results were obtained. F showed a cloudiness after standing a short time, and a precipitate settled slowly, but would be easily diffused on shaking. G showed an immediate precipitation and corresponded closely to mixtures A, B and C in this regard. Mixtures D and E remained clear. With quinine, therefore, alcohol did not prevent precipitation with bromide, but the acid salt yielded a solution which remained clear for two weeks. Glycerin and syrup failed to prevent precipitation, but were useful as suspending agents.

Experiments with other alkaloids in combination with potassium bromide showed that with codeine a precipitate formed in each case and was not prevented by any of the agents previously used.

Morphine was not precipitated by bromides.

Iodides were next tried. With potassium iodide quinine was precipitated in each case. Alcohol appeared to prevent precipitation in part, but not wholly. Syrup and glycerin proved to be excellent agents for suspending and diffusing the precipitates. When half an ounce of glycerin is added to an ounce and a half of tincture of cinchona, and two drachms of potassium iodide dissolved in the mixture, there was no cloudiness apparent no standing and no precipitate settled, as was the case with plain tincture of cinchona. This would indicate that glycerin is the active agent rather than alcohol in the compound tincture of cinchona in producing presentable mixtures with iodides and bromides.

Strychnine acted with iodides in a similar manner as with bromides, glycerin and syrup, apparently preventing the precipitation.

Further mixtures were made as follows:

	A	B	C	D	E
Quinine Sulphate	5 grains	5 grains	5 grains		
Mercury Bichloride	1 grain	¼ grain	¼ grain	1 grain	1 grain
Potassium Iodide	20 grains	5 grains	5 grains	20 grains	20 grains
Dil. Sulphuric Acid	10 drops				
Alcohol		6 drachms	6 drachms		
Glycerin			1 drachm		4 drachms
Tr. of Cinchona				2 ounces	1½ ounces
Water	2 ounces	2 drachms	1 drachm		

In mixtures A, B and C, precipitates formed immediately. (B and C have the same alcoholic strength as tincture of cinchona.) In D, only cloudiness was apparent at first, but on standing a considerable sediment was deposited, while in E no cloudiness appeared and no sediment. Syrup was found to act in a similar manner to glycerin. With morphine and with cinchonine precipitates occured with iodide, and neither glycerin, nor syrup, nor mucilage of acacia were of any help in preventing or suspending them. Cocaine and codeine formed precipitates quickly, and were not prevented by glycerin or syrup. These had a value here, however, in suspending the insoluble matter and allowing of a more even dosage.

Strychnine was tried as follows:

	A	B	C	D	E
Strychnine	1 grain	1 grain	1 grain	1 grain	1 grain
Mercury Bichloride	1 grain	1 grain	1 grain	1 grain	1 grain
Potassium Iodide	20 grains	20 grains	20 grains	20 grains	20 grains
Alcohol	1 ounce	6 drachms			
Glycerin			1 ounce		
Syrup				1 ounce	
Mucilage of Acacia					1 ounce
Water	1 ounce	10 drachms	1 ounce	1 ounce	1 ounce

In A and B precipitation took place immediately, and in such a condition that an even dose could not be administered. In C, D and E precipitation occurred slowly. The least amount of precipitation occurred in C and the glycerin suspended it well, but in D, though the precipitate was more bulky, it remained in suspension better. With glycerin the insoluble matter settled in about 10 minutes, while with syrup it remained diffused 30 minutes. Mucilage not only failed to suspend it well, but made it adhere in clots.

The conclusion arrived at is that glycerin or syrup is the best agent to use in preventing the precipitation of alkaloids with the halogen salts, or to suspend the precipitates when formed. There are cases, however, in which these are of no help.

℞ Morphinæ Muriat ..... gr. ij.
Potass. Cyanidi ..... gr. ij.
Syr. Ipecac ..... ℥ij.
Vini Antimonii ..... ℥ij.
Syr. Tolutani ..... ℥ss.
Aquæ, ad ..... ℥ij.
Misce.

This produced a grayish-white precipitate when mixed, which, when filtered out, washed and tested, showed the presence of both morphine and cyanogen, indicating its composition to be morphine cyanide. It could be diffused by shaking, but the combination is better avoided.

℞ Cocainæ Hydrochloratis.
Argenti Nitratis.....āā gr.j.
Aquæ destillat..... ℥j.
Misce fiat collyrium.

This prescription has been frequently met with in recent years. The hydrochlorate and silver salt are obviously incompatible, and if the prescription be compounded and filtered it can contain but about half the silver nitrate, approximately 2 grs. of cocaine hydrochlorate precipitating one grain of silver nitrate. One prominent Boston druggist is in the habit of filling this by using cocaine alkaloid, claiming that it is soluble in the silver nitrate solution, but careful trial failed to demonstrate this.

A neutral cocaine nitrate was made by neutralizing an ethereal solution of the alkaloid carefully with weak nitric acid and evaporating to dryness.

On substituting this for the hydrochlorate, a clear solution was obtained, which remained clear for several weeks when kept in a dark closet, showing no reduction of the silver by the alkaloid salt.

℞ Potass. Iodidi..... ℥ij.
Syrup. Ferri Iodidi..... ℥iss.
Aquæ ..... ℥x.
Misce.

This was compounded a number of times, using different brands of potassium iodide. In some of the mixtures a dark-colored, flocculent precipitate was formed in considerable quantity, while in others only a slight cloudiness appeared upon standing. In all cases a comparatively fresh and green-colored syrup of iron was used, containing no free iodine or ferric iron.

An examination of the potassium iodides used showed all to contain iodate, but in widely varying proportions, from a minute trace to a very appreciable quantity. The mixtures showed the precipitate in proportion to the quantity of iodate present as an impurity. No potassium iodide entirely free from iodate was obtainable, but the conclusion was reached that the precipitation in the above mixture is due to the presence of iodate, and not to any reaction between the specified ingredients.

℞ Tinct. Ferri Chlor..... ℥ij.
Acid. Carbolici..... Min.vij.
Potass. Chloratis..... ℥ss.
Aq. hydrogen. dioxidi..... ℥ss. M.

This makes a dark blue solution which effervesced slowly. According to one writer, this effervescence is due to reactions between the last ingredient and each of the others. Careful trials failed to show any effervescence except when the tincture of iron was mixed with the peroxide solution. This resulted in a reduction of the peroxide and a reduction followed by immediate reoxidation of the iron. The color is due to the combination of carbolic acid and iron. The prescription may be dispensed with a caution to keep the bottle upright and loosely stoppered, but the value of the hydrogen peroxide here is questionable.

℞ Liq. Ferri Dialysati ..... ℥ij.
Liq. Potass. Arsenitis ..... ℥ij.
Aquæ ..... ad ℥iv. Misce.

Upon mixing the iron with the water, then adding the Fowler's Solution, a dense magma was formed which could not be poured from the bottle. Since ferric hydrate, which is here formed, is the official antidote to arsenic, the therapeutic incompatibility

is here quite as important as the chemical. By using the official liquor acidi arsenosi a clear solution was obtained. Three different makes of dialyzed iron were tried in each case, with no difference in results.

℞ Zinci Sulphatis.
Plumbi Acetatis ..... āā ℥ ss. M. ft. pulv.

The statement has been made that these salts become pasty or liquefy when triturated together, due to the liberation of the water of crystallization in the lead acetate. By light trituration no evidence of change was obtained, even on long standing. By very heavy trituration, continued for about twenty minutes, a pasty mass was obtained. With a medium degree of pressure, continued for five minutes, the powders remained dry. Since the latter method would ordinarily be followed in compounding this prescription it may be considered compatible.

℞ Salol ..... ℥ ij.
Tr. Ferri Chlor ..... ℥ ij.
Spir. Æth. Nitrosi ..... ℥ j.
Glycerini ..... ℥ ss.
Aquæ ..... ℥ v. Misce.

Salol is insoluble in water, but soluble in alcohol, and with tincture of iron is colored purple. If the salol be dissolved in the alcohol and the tincture added to this, a deep violet colored liquid results, and on adding the water the salol is precipitated in a flaky and sticky condition, which causes it to adhere obstinately to the bottle. The supernatant liquid gradually turned brownish-red, and it is possible that nitro-salicylic acid formed from the decomposition of both the nitrous ether and a portion of the salol. The prescription was compounded a second time by first suspending the salol in water by aid of 2 drachms of mucilage of acacia. The glycerin was next added, then the tinctures and spirit. The result was a light-brownish mixture, which easily became homogeneous on shaking. It did not change in color as rapidly as the first mixture, but it gradually darkened, and at the end of two weeks was almost black. The spirit of nitrous ether was freshly prepared. The mixture, at best, is unsatisfactory, and should be frequently prepared if used at all.

℞ Ext. Buchu fld.
Ext. Cubebæ fld ..... āā ℥ j.
Tr. Hyoscyami ..... ℥ j.
Ol. Terebinthinæ ..... ℥ ss.
Mucil. Acaciæ ..... ad ℥ iv.
Misce fiat emuls.

Both of the fluid extracts being strongly alcoholic, it would seem that an emulsion would be improbable. But by emulsifying the oil first with the mucilage in a mortar, then adding the tincture and fluid extracts slowly, triturating well after each addition, a smooth brownish-colored emulsion was obtained.

A much better appearing emulsion was prepared by first emulsifying the oil with two drachms of powdered acacia and four drachms of water, then diluting this to fourteen drachms with water and adding the tincture and fluid extracts as before. This emulsion was smoother, olive-green in color and stood up better.

℞ Calamini.
Zinci Oxidi ..... āā ℥ ij.
Sulphuris Præcip ..... ℥ ss.
Ol. Olivæ ..... ℥ iv.
Acid. Carbolic ..... ℥ iij.
Aquæ ad ..... Oj.
M. ft. lotio.

A writer in the Pharmaceutical Journal directed to prepare this by mixing the powders with an ounce of water, warming gently and then stirring in the oil and heating until saponification took place, after which the remainder of the water and the acid are added. So prepared, a pink, creamy lotion, very smooth and inviting, was obtained. It was found that the heating must be done cautiously, because if too high a heat is used or too long continued, a putty-like oleate is obtained which will not diffuse, and the mixture is anything but creamy.

Emulsifying the oil with acacia, then adding the other ingredients, yielded a preparation much darker in color and much less inviting in appearance.

℞ Spir. Ammoniæ Aromat. ..... ℥ij.
Tinct. Quininæ (Ph. Br.) ..... ℥iv.
Tinct. Nucis Vomic ..... ℥ss.
Syrup. Aurantii ..... ℥iv.
Aquæ ..... ad ℨiv. Misce.

When compounded as written the mixture was quite presentable at first, possessing only a little cloudiness with little separation on standing. Upon standing a few hours, the volatile oils and resinous matters in the tinctures and spirit collected in masses upon the sides of the bottle and would not diffuse upon shaking. The prescription was compounded again as follows:

Three drachms of mucilage of acacia were first mixed with three fluid ounces of water, then the syrup, tinctures and spirit were added successively with shaking. This mixture was hardly as inviting at first as that containing no mucilage, but it remained nearly homogeneous and no deposits of oily or resinous matter took place. It was easily diffusible by shaking after standing several weeks.

℞ Camphoræ,
Chloralis ..... aa ℥ss.
Syr. Zingiberis.
Aquæ ..... āā ℨi. Misce.

This was mixed in several ways, and the results noted. First the camphor and chloral were triturated together until liquefied, then the syrup and water were added successively. The chloral-camphor adhered together in semi-solid globules and refused to diffuse through the liquid. A second trial was made by adding 2 drachms of mucilage of acacia to the liquefied solids and triturating until an emulsion was formed, which was diluted with the syrup and water. This made a presentable mixture in which the chloral and camphor were evenly diffused. It separated into layers on standing but was easily rendered homogeneous by shaking.

In a third trial the chloral was dissolved in the water, the syrup added and then the camphor, previously powdered, was shaken in. This also produced an inviting mixture, in which the camphor was evenly diffused by shaking. No change was observed in it after standing two weeks.

℞ Bismuth. Subnitratis ..... ℥v.
Acid Carbolic ..... Min. xx.
Tr. Capsici ..... ℥i.
Alcoholis ..... ℥ij.
Olei Gaultheriæ ..... ℥i.
Spir. Ammon. Aromat ..... ℥iv.
Aquæ ..... ℨij. Misce.

Mixed as written this forms a pasty, semi-fluid mixture which adheres to the sides of

the bottle and is very uninviting. This is due to the separation of the oils and resinous bodies in the spirits and tincture, and their adhesion to the bismuth powder. A presentable mixture was obtained by first mixing 4 drachms of mucilage of acacia with 4 drachms of water, to which was slowly added the tincture, spirit and oil of wintergreen dissolved in the alcohol, with constant trituration. To this emulsion the bismuth and carbolic acid were added, and the resulting mixture remained easily diffusible for several weeks. The use of 2 drachms of powdered acacia in place of the mucilage produced the same result.

℞	Sodii Salicylatis	℥v.	
	Strontii Bromidi	℥iv.	
	Liq. Potasii Arsenitis	℥iv.	
	Elix. Gentianæ	℥vi.	
	Aquæ	ad ℥viii.	Misce.

By dissolving the sodium and strontium salts in the water and adding the Fowler's Solution, a precipitate forms of strontium carbonate which does not dissolve. If the elixir be added before the Fowler's Solution, a cloudy mixture is obtained with no marked precipitation. By using the acid solution of arsenic of the Pharmacopœia in place of Fowler's Solution, a precipitate of salicyclic acid is formed by the first method of mixing, and a cloudiness by the second method, not as marked, however, as when Fowler's Solution is used. By using solution of sodium arsenate as a substitute for Fowler's Solution, a clear and permanent liquid was obtained.

℞	Potassii Bromidi	℥v.	
	Potassii Citratis	℥iii.	
	Strontii Bromidi	℥iv.	
	Syr. Limonis	℥ij.	
	Aquæ	ad ℥iv.	M.

Strontium citrate is insoluble in water, and if the salts are mixed directly this forms as a dense and bulky precipitate.

By dissolving the potassium citrate in half an ounce of water and the bromides in the remainder of the water, then mixing the syrup with the bromide solution and adding the citrate solution last, the resulting precipitate is much less dense and a better appearing preparation is obtained. It should be dispensed with a shake label.

℞	Spir. Aetheris Nitrosi	7.5	
	Ammon. Chlorid.	1.5	
	Potass. Chlorat.	1.0	
	Syr. Pruni Virg.	30.0	
	Infus. Ipecac	90.0	Misce.

On mixing this prescription, a copious dark-brown precipitate was formed and a vigorous effervescence took place. On investigation this proved to be due to the combination of the spirit of nitrous ether with the syrup of wild cherry and the infusion of ipecac. It was found that a syrup of wild cherry made from an old bark and consequently rich in tannin, will react energetically with nitrous ether, evolving a gas and forming a voluminous precipitate.

The same reaction occurs with infusion of ipecac. There is no way of preventing this reaction in the above, except in so far as the use of a young cherry bark will mitigate it.

℞ Sodii Salicylatis ..... ℥j.
Spir. Ætheris Nitrosi ..... ℥ss.
Syrupi ..... ℥ss.
Aquæ ..... ℥j.
Misce.

This prescription when first compounded was colorless, but it rapidly darkened and became a dark brown and finally black. If the sodium salicylate be dissolved in the spirit alone the same change takes place, but much more slowly, the rapidity depending upon the condition of the spirit used. Needle shaped crystals separated which could be redissolved by gentle warming. Some of the crystals were collected and found to be free from sodium, but they responded to several tests for nitro-salicylic acid. The solution was found to contain nitrates, presumably of sodium. The conclusion arrived at was that the nitrous ether is first decomposed by the water, liberating nitrous acid, which then is oxidized to nitric acid by the air, and then the salicylic acid liberated is changed to nitro-salicylic acid. This last being irritant, the prescription should not be dispensed.

℞ Zinci Sulphatis ..... gr. xviii.
Bismuthi Subnitratis ..... ℥iv.
Aquæ Hydrogenii Dioxidi,
Aquæ..... ....āā ℥iij.
Misce.

When mixed this evolved a gas which, on testing, proved to be oxygen. On trial, the reaction was found to be due to the combination of hydrogen peroxide with the bismuth subnitrate. This can be avoided by employing bismuth subcarbonate in the place of the subnitrate, but a possible reaction between the zinc sulphate and the subcarbonate should be considered.

FOURTH SESSION—TUESDAY EVENING, SEPTEMBER 5, 1899.

No business was transacted by the Association previous to the first session of the Section on Scientific Papers.

FIFTH SESSION—WEDNESDAY MORNING, SEPTEMBER 6, 1899.

No business was transacted previous to the second session of the Section on Scientific Papers.

SIXTH SESSION—WEDNESDAY AFTERNOON, SEPTEMBER 6, 1899.

No business was transacted previous to the third session of the Section on Scientific Papers.

SEVENTH SESSION—FRIDAY MORNING, SEPTEMBER 8, 1899.

No business was transacted previous to the first session of the Section on Education and Legislation.

EIGHTH SESSION—FRIDAY AFTERNOON, SEPTEMBER 8, 1899.

No business was transacted previous to the second session of the Section on Education and Legislation.

NINTH SESSION—FRIDAY EVENING, SEPTEMBER 8, 1899.

No business was transacted previous to the third session of the Section on Education and Legislation.

TENTH SESSION—SATURDAY MORNING, SEPTEMBER 9, 1899.

The Tenth General Session was called to order by President Dohme in the west parlors of the hotel at 10 o'clock a. m.

The Secretary read the minutes of the Second General Session.

Dr. Whelpley moved that the minutes be approved as read. The motion was seconded by Mr. Stevens and carried.

The Secretary read the minutes of the Third Session, which, upon motion of Mr. Kennedy, were adopted as read.

The Secretary of the Council read the minutes of that body, as follows:

FIFTH SESSION OF THE COUNCIL—SEPTEMEBER 6, 1899.

Council convened at Hotel Victory, at 9 a. m., with the following members present: Messrs. Beal, Caspari, Diehl, Dohme, Payne, Rapelye, Main, Mayo, Good, Kennedy, Lyons, Rusby, Sheppard, and Chairman Thompson, who presided.

The minutes of the fourth session were read and adopted. The Secretary stated that he called upon the Chairman of the Committee on General Prizes in reference to the premature publication of their report, and in reply had received the following communication:

"Mr. Geo. W. Kennedy, Secretary of Council, has called on me for an explanation relative to the premature publication of the report of the Committee on General Prizes. I was not aware, until Mr. Kennedy spoke to me, that it was a violation of any rule of the Association. The finding of the Committee was handed to the News Letter, published by the University of Michigan. This is sent to some journals in the country, and was reprinted. I do not hesitate to confess frankly that it was ignorance of the law that led me to hand the report to any one but the General Secretary. Regretting exceedingly my grave error. Yours truly,

"J. O. SCHLOTTERBECK."

On motion of Mr. Main, duly seconded, the communication was accepted and ordered to be spread upon the minutes.

The Secretary of the Committee on Membership presented the names of 10 applicants for membership, which were ordered to take the usual course.

On motion, Council adjourned.

GEO. W. KENNEDY, *Secretary.*

FIRST SESSION OF THE NEW COUNCIL—SEPTEMBER 6, 1899.

Council assembled at 10 a. m., for the purpose of reorganization, with the following members present: Messrs. Sheppard, Thompson, Caspari, Prescott, Dohme, Whelpley, Diehl, Kennedy, Good, Main, Mayo, Whitney and Eliel.

Temporary organization was effected by the election of T. F. Main as Chairman, and G. W. Kennedy as Secretary.

J. M. Good nominated W. S. Thompson for Chairman, and the nominee was elected by the Secretary, on motion, casting an affirmative ballot.

Chairman-elect Thompson took the Chair and thanked the Council in a few appropriate remarks.

Chas. E. Dohme nominated Jas. M. Good for Vice-Chairman. There being no other nominations he was elected by the Secretary depositing an affirmative ballot.

Thos. F. Main nominated Geo. W. Kennedy for Secretary, and on motion, he was elected by the Chair casting an affirmative ballot.

S. A. D. Sheppard moved that the officers of the Council be instructed to bring in recommendations relative to committees, at the next session, which was adopted.

C. A. Mayo moved that such a sum of money as may be required be appropriated to enable the committee appointed by the Association to prepare suitable resolutions and procure a badge for the Secretary of Council in commemoration of his 25th anniversary as an officer, to carry out their instructions. The motion was seconded and adopted.

Thos. F. Main moved that the Committee on Practical Pharmacy and Dispensing, appointed last year, be continued for this year, which was adopted.

On motion, Council adjourned to meet Friday morning at 9 o'clock, unless otherwise called together by the Chair. GEO. W. KENNEDY, *Secretary.*

SECOND SESSION OF THE COUNCIL—SEPTEMBER 8, 1899.

Council convened at 9 o'clock a. m. Present Chairman Thompson and Messrs. Main, Mayo, Rapelye, Eliel, Kennedy, Whitney, Hopp, Caspari, Sheppard, Dohme, and Whelpley.

The minutes of the two previous sessions were read and approved.

The Committee on Membership presented the names of two applicants for membership, which, on motion, were directed to take the usual course.

The committee appointed to bring in recommendations in regard to the committees of Council, submitted the following:

Committee on Membership—H. M. Whitney, W. A. Frost, H. M. Whelpley, H. R. Gray, Wm. L. Dewoody, L. C. Hopp, T. Ashby Miller and the Treasurer and General Secretary of the Association *ex-officio.*

On motion of Thos. F. Main, the committee was nominated and elected.

Committee on Finance—Chas. E. Dohme, Thos. F. Main and Chas. A. Rapelye.

On motion, this committee was nominated and elected.

Committee on Publication—Chas. Caspari, Jr., C. Lewis Diehl, Jas. M. Good, C. B. Lowe and Leo Eliel.

On motion, this committee was nominated and elected.

Committee on Transportation—A. E. Ebert, S. A. D. Sheppard, C. A. Mayo, Chas. Caspari, Jr., C. M. Ford, Wm. J. M. Gordon, M. B. Avary, H. M. Whelpley, Wm. M. Searby, Chas. T. Heller, A. K. Finlay and T. A. Miller.

On motion, this committee was nominated and elected.

Committee on Centennial Fund—The composition of this committee is provided for in the By-Laws. It will consist of A. B. Prescott, Chas. E. Dohme and Chas. Caspari, Jr.

The Chairman appointed the following gentlemen as an Auditing Committee for the current fiscal year: Chas. A. Rapelye, T. R. Shannon and P. W. Newton.

T. Ashby Miller was nominated for the position of Local Secretary, and, on motion, was duly elected.

On motion of S. A. D. Sheppard, Chas. Caspari, Jr., was made chairman of the Committee on Transportation.

On motion of Geo. W. Kennedy, Council took a recess of five minutes for the purpose of allowing the various committees to select their chairmen.

On reassembling, the committees named their respective chairmen, as follows:

Committee on Publication—Chas Caspari, Jr.

Committee on Finance—Chas. E. Dohme.

Committee on Membership—H. M. Whelpley.

As secretary of the Committee on Membership, Geo. W. Kennedy was nominated and duly elected.

The following communication was presented and read:

PUT-IN-BAY, *Sept.* 8, 1899.

To the Council of the American Pharmaceutical Association.

Gentlemen: At the third session of the Scientific Section, the following motion was unanimously adopted:

The Scientific Section respectfully requests the Council of the Association to authorize the expenditure, by the Committee on Publication, of the sum of $100, or so much thereof as may be necessary, for the preparation of color plates in connection with the paper of Henry Kraemer, entitled "Color Standards of Drugs."

Respectfully submitted, CASWELL A. MAYO, *Sec'y pro tem.*

On motion of H. M. Whelpley, it was agreed that the request of the Scientific Section be granted and that the appropriation asked for be placed at the disposal of the Committee on Publication.

The following communication from the late Committee on Finance, having been delayed, was presented and the recommendation adopted:

The Committee on Finance recommends the transfer of the Life Membership Fund the Ebert Prize Fund and the Centennial Fund, now on deposit in the Savings Bank of Dover, N. H., to the Philadelphia Saving Fund, and that the Treasurer be instructed to make the change.

JOSEPH P. REMINGTON,
THOS. F. MAIN,
JAMES H. BEAL.

The following resolution was presented by J. P. Remington in compliance with instructions at a former session of Council:

The American Pharmaceutical Association desiring to express its high appreciation of the eminent services of its distinguished member, Edward Robinson Squibb, M. D., to American pharmacy, and in commemoration of the eightieth anniversary of his birth, July 4, 1899, offers to him its most hearty congratulations. His long and arduous labors for the advancement of pharmacy, his high standards of professional practice and his unselfish devotion to the highest ideals, have endeared him to every member. That many years of usefulness and continued good health may be vouchsafed to its honored member, is the unanimous hope and wish of this Association.

The resolution was unanimously adopted.

The Auditing Committee presented the following resolutions:

Resolved, That the Auditing Committee be authorized to procure the services of an accountant to assist them in the work of examining the books and accounts of the officers of the Association, the expense of said examination not to exceed the sum of ten dollars per annum.

Resolved further, That the Treasurer, General Secretary and the Chairman of Council, be requested to prepare for the use of the annual Auditing Committee a schedule of rules and directions for the auditing of the books, accounts and funds of the Association, and present the same for approval of the Council at the next annual meeting.

On motion of Geo. W. Kennedy, seconded by Thos. F. Main, the resolutions were adopted.

Thos. F. Main submitted the following resolution:

Resolved, That no advertisements be solicited or accepted for any of the publications or programs issued by or in the name of the American Pharmaceutical Association.

H. M. Whelpley moved to amend the resolution by adding that the General Secretary be instructed annually to inform the Local Secretary of this resolution and to furnish copies of the same to the pharmaceutical press.

The amendment was accepted, and the original resolution as amended was adopted.

J. H. Beal, chairman of the committee appointed at the last annual meeting to present suggestions as to the Association finances, submitted the following recommendations to amend the Constitution:

1st. Amend Article IV. by striking out everything after the word "securities" in the third line, and insert in place thereof the following: "And shall be preserved intact until the annual interest therefrom shall reach the sum of two thousand dollars."

2d. Amend Article V. by adding the following sentence at the close of the paragraph: "Any proposition to amend the Constitution for the purpose of permitting the expenditure of the permanent invested funds of the Association shall require a majority of seven-eighths for its passage."

Chas. Caspari, Jr., offered the following substitute for the first recommendation of the Committee:

Amend Article IV. of the Constitution by striking out the word "annual" in the third line, and the words "shall" and "current" in the fourth line, and insert the words "for any current year" after the word "which" in the third line, and the word "may" after the word "only" in the fourth line, so as to read, "the interest of which for any current year only may be used by the Association for its expenses."

On motion of J. M. Good, duly seconded, the substitute of Chas. Caspari, Jr., and the Committee's second recommendation were adopted.

H. M. Whelpley submitted on behalf of the Committee on Practical Pharmacy and Dispensing, a bill for $14.65 for printing and postage, which, on motion of G. W. Kennedy, was ordered to be paid.

On motion of C. A. Mayo, the unexpended balance from the appropriation of last year to the Committee on the Status of Pharmacists in the Government Employ was reappropriated for the use of the Committee.

On motion, the Council adjourned. GEO. W. KENNEDY, *Secretary.*

THIRD SESSION OF THE COUNCIL—SEPTEMBER 9, 1899.

Council convened at 9 o'clock, a. m., with the following members present: Messrs. Prescott, Diehl, Miller, Caspari, Eliel, Whitney, Good, Dewoody, Rapelye, Dohme, Whelpley, Sheppard and Chairman Thompson.

On motion of T. F. Main, the reading of the minutes of the second session was dispensed with.

H. M. Whelpley moved that H. P. Hynson be continued as Chairman of the Committee on Practical Pharmacy and Dispensing, which was adopted.

Thos. F. Main moved that an appropriation of $50 be made for the use of the Committee on Practical Pharmacy and Dispensing, which was adopted.

Thos. F. Main moved that the Committee of Arrangements provide time for reading and discussing the report of the Committee of Practical Pharmacy and Dispensing. The motion was duly seconded and carried.

The following resolution was offered by Thos. F. Main and unanimously adopted:

Resolved: That the Committees of the various Sections be notified annually by the General Secretary that it is their duty to act as censors of all papers presented to their respective Sections, and that no papers be printed in advance of the meeting unless they possess permanent value; also that it is their duty to limit and arrange the time to be allowed for presentation of each paper.

On motion, Council adjourned to meet at the call of the Chair.

GEO. W. KENNEDY, *Secretary.*

On motion of Dr. Stewart, the minutes of the Council were adopted as read.

MR. THOMPSON: I would like to ask unanimous consent to present the report of the committee on the resolutions of thanks to Mr. Kennedy. Each member of the committee was personally anxious to write these resolutions, on account of the high regard in which Mr. Kennedy is held by us. We have considered the matter well, and have here a medal which we wish to present to Mr. Kennedy now, accompanied by this letter —which we have thought would be more appropriate, perhaps, than a formal set of resolutions.

Mr. Thompson then read the following:

PUT-IN-BAY, OHIO. *September* 9, 1899.

MR. GEORGE W. KENNEDY, *Secretary of the Council, A. Ph. A.*

Dear Sir: In the name of the American Pharmaceutical Association we have the honor of extending you its greetings on the completion of twenty-five years' continuous service as an officer of the Association, and to express to you its high appreciation of your devotion to the interests for which you have so effectively labored.

Because of your uniform kindness and courtesy, every member bears for you an affectionate regard. As a testimonial of this pleasant occasion the Association begs you to accept the accompanying token, with the wish of all its members that you may long live to wear it.

Kindly accept the assurance of the pleasure this duty gives us, and of our sincere personal regard.

W. S. THOMPSON,
JAMES M. GOOD,
S. A. D. SHEPPARD,
Committee.

The token is a gold medal bearing the following inscription:

A. Ph. A., 1899.
Twenty-five years continuous service as an officer.
Presented to GEO. W. KENNEDY, by the American Pharmaceutical Association, at Put-in-Bay, Ohio.

Mr. Thompson, turning to Mr. Kennedy, then said:

Now, Mr. Kennedy, it gives me the greatest pleasure in the world to put this medal upon the lapel of your coat, where I am sure you will always wear it with pleasure to yourself and honor to the Association which presents it to you. (Long applause.)

Mr. Kennedy replied:

Mr. Chairman, Members of the Committee, and Members of the Association: I thank you very kindly. This has taken me by surprise, and I really am not in a condition to say anything. But I feel very proud of this honor, and hope I shall always continue to do my duty as long as I am an officer of this Association, and that you will never have cause to regret your action. I thank you again, gentlemen, very kindly.

The Secretary of the Council read a list of additional names proposed for membership, which were ordered posted for inspection.

Mr. Sheppard moved that the time allowed by general order of the Council, adopted last year, for publication of the Proceedings be extended from 70 working days to 100 working days. Mr. Mayo seconded the motion.

The President stated for the information of the members that it was found practically impossible to do this work in the time allotted, and said it would be best to give the time necessary.

The motion was put to a vote and carried.

MR. MAYO: Since arriving here I have received notice of the death of one of our honorary members, and in respect to his memory I would like to read a brief notice of his career and move that this be referred to the Committee on Membership, to be incorporated in its obituary notices in the report for this year.

Mr. Ebert seconded the motion of Mr. Mayo, and it prevailed.

DR. LOWE: I would like to bring a little matter to the attention of the Secretary. In the Section on Education and Legislation it was ordered that the Secretary be instructed to send a sufficient number of reprints of the statistics as compiled by the Secretary of the Section to the secretaries of the different State Pharmaceutical Associations. It has been so difficult to get these statistics from these secretaries that it was thought if they were furnished them, as far as we have been able to get them, and they could see the results, they would be more willing to furnish us like statistics.

On motion of Mr. Mayo, the General Secretary was empowered to furnish the necessary reprints.

Mr. Hynson offered the following resolution, which, upon motion, was adopted:

Resolved, That the Committee on Publication be requested to investigate the propriety of changing the form of publication of the Proceedings of the Association, and that it be directed to report at the next annual meeting.

Upon motion of Mr. Diehl, the members generally were invited to give the benefit of any ideas they might have on this subject to the committee named.

Dr. Whelpley moved that the Committee on National Formulary be authorized to prepare the manuscript for an addendum, or appendix, to the second edition of the National Formulary, this to contain such additional formulas as may be necessary, and also any corrections or suggestions in regard to the formulas already published. Mr. Hallberg seconded the motion, and it carried.

DR. WHELPLEY: Now I move that the question of compensation for this work, as well as for that of preparing the addendum to the National Formulary, be referred to the Council for action. Some of us have not realized the immense amount of work that the committee has been doing gratuitously for this Association, and I move that the question of compensation be referred to the Council, with power to act.

The motion was seconded by Mr. Good, and prevailed.

Mr. Caspari moved that the Council resolutions in commemoration of Dr. E. R. Squibb's 80th birthday anniversary be suitably engrossed and forwarded. Mr. Sheppard seconded the motion, and it was put and carried.

The Secretary called for the report of the Committee on Transportation, which had been deferred to this session. Mr. Ebert read the report as follows:

REPORT OF THE TRANSPORTATION COMMITTEE.

The committee respectfully report that they succeeded in securing a rate of one-and-a-third fare on the certificate plan. Unfortunately, owing to the length of the session being two weeks, the rate was not secured until a late date, and hence the necessary information was not forwarded to the members until a date which was later than we would have preferred. The committee was under an expense of seventeen dollars on account of the expenses of the joint agent of the railroads, and of eight dollars on account of postage, a total of twenty-five dollars. We recommend that the General Secretary be authorized to have printed 50,000 slips, bearing a notice of the next meeting, to be distributed by the members of the Transportation Committee.

A. E. EBERT, *Chairman.*

Mr. Alpers moved to receive the report.

THE SECRETARY: The report carries a recommendation that the General Secretary have printed 50,000 slips, giving notice of the time and place of next meeting, to be distributed through the Transportation Committee.

MR. EBERT: The Transportation Committee will undertake to distribute them to the wholesale druggists in the different districts in the country, who will send them out to their customers in their mail. Some of these will be wasted, it is true, but the small amount of money that it will take to print these 50,000 slips is a mere bagatelle when the good it will do is considered. It will call attention to the American Pharmaceutical Association, and will bring attendance to the meeting.

Mr. Good seconded the proposition to print these notices.

The motion to print 50,000 slips giving notice of the time and place of next meeting was put and carried.

The Secretary then read the following report from the Committee on Materia Medica Titles:

The Committee appointed by the American Pharmaceutical Association to confer with a similar committee of the Section on Materia Medica and Therapeutics of the American Medical Association in regard to the nomenclature to be adopted for the synthetic remedies that may be adopted in the United States Pharmacopœia of 1900, has been unable to secure such a conference. It finds, however, that the subject has already been treated in the report of the Special Committee on National Legislation, which seems to leave nothing to be done by this Committee.

Respectfully submitted, A. B. LYONS, *Chairman.*

Mr. Alpers moved to receive and refer for publication. Carried.

The Secretary called for the report of the Committee on President's Address of 1888, and Dr. Whelpley, chairman, read the report as follows:

REPORT OF COMMITTEE ON PRESIDENT J. U. LLOYD'S 1888 ADDRESS.

The members of your committee very forcibly feel the anomaly of their position in being called upon to report on the presidential address delivered just eleven years ago at Detroit, Mich.

Relentless time has wrought many changes in the exigencies of the pharmaceutical calling since that date. Some of the suggestions apropos then are out of place to-day. Other propositions contained in the address have since been before the Association and acted upon.

The address (see pages 3 to 17 of the American Pharmaceutical Association Proceedings for 1888) consists of about 10,000 words, and presents 25 topics for discussion. It was referred to a committee of five (see page 18), who reported (see page 54) that the members found it impossible to give a complete digest in the limited time at their disposal. Two sections (22 and 25) were acted upon by the Association and the committee at their own request given further time to report on the rest of the document. Thus the matter rested until last year, when the undersigned committee was charged with the duty of completing the work (see page 97 of the American Pharmaceutical Association Proceedings 1898). Before taking up the sections *seriatim* we feel it our duty to emphasize the wide scope of subjects considered, and note the keen insight of the author who so truly divined the future trend of pharmaceutical affairs, as evidenced by the developments since the address was written.

Commercial and Professional Rules.—Your committee does not feel that the time is opportune for the establishment of a list of commercial and professional rules. As suggested by the President, the Golden Rule should be our code of ethics—our rule of business.

Changing Name of Association.—We do not believe that the name of "American Apothecaries' Association" would more closely represent the designs of its founders than does "American Pharmaceutical Association. The word "pharmacist" is more generally used in America to designate retail druggist than is the word "apothecary."

Limiting Membership to Retail Druggists.—In our judgment the President was wise in hesitating to make a direct recommendation that the membership be limited to retail druggists, although such action would no doubt have avoided the formation of a national association of retail druggists at a later date. The American Pharmaceutical Association is and must continue as the conference of all persons interested in the welfare of pharmacy.

The following are the subjects touched upon by the President in the numbered sections of the address:

1. *Apprenticeship.*—As pointed out in the address, our members should encourage apprentices in obtaining pharmaceutical education by attending colleges having ample laboratory facilities, and where the manufacture of pharmacopœial preparations is taught.

This Association has already taken action favoring the preliminary examination of apprentices and also of applicants for matriculation in colleges of pharmacy. (See American Pharmaceutical Association Proceedings, Vol. xxxiii., page 515; xxxvii., 281 and 283.) The commercial, scientific and professional sides of pharmacy must be recognized, and should all be impressed upon the receptive mind of the apprentice.

2. *Manufacturing Industries.*—The assertion that the large modern manufacturing houses are here to remain appears to be well founded. It is also true to-day as in 1888 that "common sense business principles" are necessary on the part of the druggist who does his own manufacturing.

3. *The "Physicianed Apothecary."*—The pharmacist who understands medicine and the physician who has graduated in pharmacy are the ones most likely to respect each other's calling. Experience, as well as the address under consideration, favor such education.

4. *A Percentage to Physicians.*—We do not feel that the proposed by-law would add force to the condemnation of the practice as expressed in 1852 (see Proceedings, page 25.)

5. *Ready-Made and Numbered or Fancifully-Named Mixtures.*—No such understanding between pharmacist and physician should be encouraged. If the pharmacist is ready to give the formulas for these preparations to his fellow druggists, the practice is not necessarily unethical.

6. *Publish the Formulas of Patent Medicines.*—It would be advantageous for the pharmacist to have a knowledge of the composition of every mixture he sells. Yet laws requiring manufacturers to publish the formula on the wrapper, however desirable, could not be enforced, and would prove a burden to the drug business of the country.

7. *Counter Prescribing.*—It is difficult to define the proper limits of this practice, over which so much discussion has occurred. Business considerations as well as ethical principles should be united in controlling it. The broader the education of the doctor and druggist the less friction is likely to exist between them.

8–9–10. *Patents and Trade Marks.*—The Association has discussed and acted upon these questions. (See American Pharmaceutical Association Proceedings, Vol. xix., page 388; xxi., 480; xxii., 565, 572; xxx., 641; xxxiii., 396; xxxvii., 39, 47, 132, 136, 138, 140, 141, 144, 325; xxxviii., 52, 54; xl., 419; xli., 284, 345, 491, 545, 546, 547, 548; xlii., 771.)

11. *Pharmacists as Secret Medicine Manufacturers.*—Many pharmacists consider it good business policy to put up a line of secret medicines to meet the demand for domestic remedies now largely supplied by the manufacturing houses. The manufacture and sale of secret medicines has been discouraged by this Association. For a statement of the position which the Association has taken on this subject see "Preamble and Resolutions," Proceedings of the American Pharmaceutical Association for 1897, page 90.

12. *Secret Remedies*, if sold at all, should be confined to the hands of the competent pharmacist.

13. *Secret Mixtures in Bulk.*—The pharmacist is not in a position to refuse to dispense orders for large quantities of mixtures unless he is convinced they are intended for illegitimate use.

14–15. *Trade Marks and Copy Rights.*—See comments on Nos, 8, 9, 10.

16. *Copyrighting Pharmaceutical and Medical Books.*—This universal practice is proper and right.

17. *Handling Copyright, Patent and Trade Mark Goods.*—See comments on Nos. 8, 9, 10.

18. *Preparations with Published Formula but Secret Process.*—No pharmacist should make a preparation and dispense it as the original, although he may feel certain that the products are identical.

19–20. *Valuable Processes as Individual Property.*—This question has been discussed, but should receive careful consideration at this time, when the United States Pharmacopœia revision work is at hand.

21. *Assuming Responsibility of Manufacture.*—No objection can be made against a pharmacist placing his own label on substances which he selects or purifies, provided he is satisfied of their identity and purity.

22. *New Class of Liquid Preparations from Plants.*—This section was referred to the Committee on Revision of the United States Pharmacopœia. (See xxxvi., 55.)

23. *Presiding Chairman.*—Your committee does not consider it necessary to create a new office of this nature.

24. *The Salaries of College of Pharmacy Teachers.*—They are not higher to-day than they were in 1888, but we do not see how this Association can raise them.

25. *Compensation for Secretaries of Sections.*—This subject was referred to the Council. (See xxxvi., 55.)

A. E. EBERT,
F. E. STEWART,
H. M. WHELPLEY,

The reading of the report was applauded.

MR. SHEPPARD: I move that the report be received and that the recommendations therein be adopted.

Mr. Good having seconded the motion, it was put and carried.

The report of the Committee on Place of Meeting in 1900 was next called for, and Mr. Alpers read the report.

REPORT OF THE COMMITTEE ON PLACE OF MEETING IN 1900.

To the President and Members of the American Pharmaceutical Association:

Your Committee would report that during the last year they have had repeated interviews with trans-Atlantic transportation companies, and also with the large tourist agencies, such as Cook & Co., New York, and others, in order to ascertain at what rates a trip to Paris in 1900 could be arranged.

From the information obtained in these interviews it appears impossible at the present time to secure any concessions or even an estimate of the probable cost of such a trip, as the steamship companies definitely refuse to say whether rates will be advanced, reduced, or remain as they are now. Your Committee would therefore recommend that the meeting of the Association in 1900 be held in New York City or in its immediate neighborhood. This will enable the Association to watch events in reference to a journey to the Paris Exposition in 1900, and all future arrangements in this respect might safely be left to the Local Committee. For the time of the meeting we would suggest the early part of July, so that those who wish to go abroad can return before the opening of the fall business.

Respectfully submitted,

WILLIAM C. ALPERS,
CASWELL A. MAYO,
ALBERT E. EBERT.

On motion of Mr. Hallberg, the report was received.

MR. HALLBERG: I believe a great many members of this Association would like to take the trip to Europe, and I am one of them. The only way I ever get anywhere is to attend the meetings of the American Pharmaceutical Association, and that has enabled me for the last twenty years to travel all over the American continent. I believe if any of the members make up their minds to go to Paris after the meeting next year, some arrangement can be made. The International Congress is to meet there, and it would certainly be worth the effort. I, for one, am going—if I have to swim. (Laughter.) I don't want to see the matter dropped, and I hope the Committee on Transportation will take the matter up and see if something cannot be done, so that when we meet next year we may take this trip if we want to.

MR. EBERT: As a member of the Committee of which Mr. Alpers is Chairman, I would say, that Mr. Alpers has done a good deal of work on this matter, and I believe it has been investigated thoroughly. I recently fell in with a well-known gentleman coming from Columbus from the meeting of the Association for the Advancement of Science—William Saunders, one of our most distinguished members, and ex-President of this

Association. He said when you get to Put-in-Bay remember me to the members of the American Pharmaceutical Association. He said also that the next meeting of the Association for the Advancement of Science would be held in the city of New York the last week in June of next year, for the especial purpose of giving their members an opportunity to make some arrangement to go in a body—or as many of them as can go—to Paris. It struck me at the time he made this statement that if we went to New York—and I told him we were going there, because I thought that would be the case—we would want to go over, or a good many of us. Now, if some committee could be appointed by the Association which would take into consideration this matter of going to Paris, I believe an arrangement could be made by which we could join with the American Association for the Advancement of Science, and the project might become a feasible one. They are going, and I have no doubt they would be glad to have those of our members who contemplate going join them, and I think the committee suggested might make some arrangement to bring about this result. Of course, it would not be expected that we would go as an Association, but quite a number of our members will probably want to go after our meeting at Richmond in May.

MR. PRESCOTT: Our meeting is a good deal earlier than that of the Association for the Advancement of Science. Generally, of course, a large number can obtain a better concession than a small number; but will not the accommodations be limited for a large number traveling together in June or July, owing to the press of travel and the limit of capacity of the steamers? Furthermore, do we not have an advantage at that earlier period in May, before the heavier travel from America will begin? I think this Association is large enough to obtain as good a concession as can be obtained by anybody, or any society or association, and I think the time set for the meeting is the best time for us to go, if at all.

MR. MAYO: I move that a committee be appointed to investigate the feasibility of getting up an excursion to Europe—to Paris—after the Richmond meeting, and that this committee report to the Council, and act upon the advice of the Council.

Mr. Hallberg seconded the motion.

MR. MAIN: I would like to amend the motion of Mr. Mayo by having the committee consist of a member each from the cities of New York, Montreal, Boston, Philadelphia, Baltimore, Chicago and Galveston.

Mr. Mayo's motion as amended by Mr. Main was put and carried, and the chair appointed on such committee Mr. Mayo (Chairman), of New York: Mr. Hallberg, of Chicago; Mr. Sheppard, of Boston; Mr. Stedem, of Philadelphia; Dr. Reed, of Montreal; Mr. Caspari, of Baltimore, and Mr. Forston, of Texas.

The report of the Auxiliary Committee on Membership was called for, and Dr. Whelpley read it.

REPORT OF THE AUXILIARY COMMITTEE ON MEMBERSHIP.

This Committee for the past year consisted of sixty-eight members representing the states and territories, the provinces of Canada, the large cities of the United States and Canada, the Army and Navy of the United States.

The members have worked individually through correspondence, conversation and at state and territorial conventions with a view of familiarizing the pharmacists with the aims and purposes of the American Pharmaceutical Association. They have carefully

avoided bringing undue pressure upon prospective candidates for membership, feeling that those who join our organization should come voluntarily. It is the expression of the members that the work they have done will bear more fruit in the future than it has this year.

Through the efforts of our Committee, the Presidents and many of the Secretaries of state and territorial associations have called attention to the American Pharmaceutical Association in their annual addresses and reports, thus keeping the organization before the most progressive class of pharmacists.

If this special Committee is continued in the future, we suggest that a sufficient sum of money be placed at its disposal to enable the members to more extensively canvass for new members. This year the individual members of the Committee have borne the expense for postage, stationery, etc.

We believe that the work of obtaining new members could be more effectually carried out if the Auxiliary Committee on Membership was made a part of the Council Committee on Membership, the Chairman of the latter Committee acting as Chairman of the combined Committees.

These suggestions are respectfully submitted for your consideration.

H. M. WHELPLEY, *Chairman.*

Mr. Sheppard moved to receive the report and adopt the recommendations made. Mr. Good seconded the motion, and it prevailed.

Mr. Ryan read the report of the Special Committee on Weights and Measures.

To the President and Members of the American Pharmaceutical Association:

The Special Committee on Weights and Measures submit the following report:

No action has been taken during the past year by the legislative branch of our government in regard to the adoption of the Metric System of Weights and Measures.

The bill, formerly before Congress, making the Metric System the legal system of weights and measures in the United States, is still in the hands of the Committee on Coinage, Weights and Measures.

Notwithstanding the inactivity of Congress on this question, we are pleased to report a healthy growth in the sentiment favoring the use of the Metric System, both in medicine and for general usage.

In many of the reports made to the President by United States consuls, the importance of the adoption of the Metric System by the United States for commercial purposes is dwelt upon and strongly recommended. In a number of recent medical journals, editorials have been published advocating its adoption by the teaching Medical Colleges.

While no definite statement can be made as to the probable action by the next Congress of the United States, or by the new committee on Coinage, Weights and Measures, yet to be appointed, it is hoped by your Committee that some definite advance can be made towards the adoption of the Metric System during the sessions of the 56th Congress.

F. G. RYAN, *Chairman.*

MR. STEDEM: I move to receive the report and refer for publication.

MR. RYAN: I would like to say in connection with this report that, as the committee was appointed to deal with Congress upon this subject, we will have a great deal of the work to do over again before any further advance can be made, because a new Congress will soon be coming in and many of the old members will go out, and there will probably be a new chairman of the Committee of Congress having that matter in hand.

MR. HYNSON: I want to say that if the manufacturing houses want to do something

really good for pharmacy, if they will follow in the footsteps of that grand old man, Dr. Squibb, they will do more than all else that has been done to advance the metric system. Our packages come into the house from his place marked in the metric system, and this soon familiarizes the clerks with it in a practical way. Even our boys—our shipping-clerk and all—are getting quite familiar with the metric system in this way. It encourages them to see it in practical use, and stimulates them to learn it. I, therefore, say that if such houses would adopt that method of marking, in spite of all opposition, they would do more to establish the metric system than anything I know of.

Dr. Reed: I believe I am as enthusiastic for the introduction of the metric system as anybody else, and I am not in favor of a waste of energy in bothering about the doctors. They may do as they please; it is of no consequence. Some argue for the system on the ground of exactness, and others of simplicity. Its decimal feature is a great attraction to many. I do not like to use the argument that the system is more exact, because that is nothing. The great argument is, that we want universality. We want a universal unit of weight; we want a universal unit of value; we want a universal unit of time; we want a universal unit of language. We also want a universal unit of coin, and that will come, I think. This change to the metric system would involve an enormous expense, but we ought to have uniformity, and the people of this country and Great Britain can afford it for the advantages they will secure. But no matter how much it costs, the advantage will justify us in making the change. We want to facilitate commerce throughout the world. So let us urge the adoption of this system, however expensive it may be, for it will benefit commerce, and thereby mankind.

Mr. Sheppard: I just want to say that the youngest boys in my store—the porter and every one—have come to a quick and easy understanding of these packages sent out as Mr. Hynson describes, and I want to give that idea my hearty support. In connection with the report made by Dr. Whelpley last evening, the physicians of Boston are strong supporters of the metric systen—at least as compared with those in many other places—and I think perhaps twenty per cent. of our prescriptions are written in that system.

Mr. Hallberg: I desire to suggest to the committee for next year that it endeavor to formulate a table of approximate equivalents for popular use of the metric system, such as was originally done years ago. For example, a metric pint—half a litre. I want to say that the metric system has never been adopted by the people of any country until that was done, and it is not used in any country except upon such an equivalent basis. Until this is done we will make no progress with the people.

Dr. Eccles: I do not know what authority Mr. Hallberg has for saying that it is necessary to have these tables of conversion in order to lead the people from one system to the other. He may have some authority, but as far as I have been able to discover, it has been in defiance of that, that the change has been made in those countries where it has been adopted. That is the very thing that holds them back. It is one of the worst things in the world to have this plan of conversion.

Mr. Hallberg: I mean a few of the commoner measurements and weights—such as the pint, gallon, yard and pound. I agree with Dr. Eccles upon the general principle of the thing.

Mr. Ryan: If the authors of the text-books—medical books of various kinds—would give the doses and quantities first in the metric weights and then the equivalent in the old system, it would be most desirable. If you give the old system first and then try to convert into the metric equivalent you get very inconveniant quantities. The metric expression of the weight should be given first and then the equivalent in the old system,

thus giving the metric system the benefit of the simpler form and throwing any awkward fractions on the old system.

MR. ELIEL: I think if the practice could be generally adopted that has been adopted in that part of Indiana I come from, there would be no difficulty regarding the introduction of the metric system, or in educating the masses in regard to the system; and that is, to introduce the metric system into the public schools. It is taught in the public schools of our State, and our children are just as familiar with the metric system as they are with the old system. The member of Congress from the 13th District of Indiana is pledged to support anything that will further the advance of the metric system by Congress.

The motion to receive the report of the committee and refer for publication was carried.

Mr. Sheppard offered the following resolution:

Resolved, That this Association respectfully calls the attention of the manufacturing pharmacists and chemists to the practical advantages that would result from the sending out of pharmaceutical products in packages on the basis of metric weights and measures, thereby better familiarizing all engaged in the handling of these products with the metric system.

The resolution was seconded by Dr. Stewart and carried.

Mr. Good made report for the Committee on Semi-Centennial Celebration as follows:

REPORT OF THE COMMITEE ON SEMI-CENTENNIAL CELEBRATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1902.

Supplementary to the report presented one year ago, your committee recommends the publication of a history of the Association, the volume to contain brief biographical sketches of the members, and a carefully prepared review of the progress of Pharmacy, and the growth of the Association, the annual Proceedings serving as a fruitful source from which, for this purpose, material may be obtained. To prepare a creditable historical jubilee volume of this kind a competent editor should be employed.

It is further recommended that provision be made for an exhibition of crude drugs, chemicals, pharmaceutical preparations, appliances and apparatus used in the practice of medicine, and in the art of pharmacy; the committee having control of this matter to use wise discrimination and rigidly exclude all articles which would, in an ethical sense, be at all objectionable. Further than this, they should be given sufficient latitude to enable them them to make the exposition an attractive and instructive one.

J. M. GOOD,
C. S. N. HALLBERG.
S. A. D. SHEPPARD,
JOS. P. REMINGTON,
ADOLPH W. MILLER,
Committee.

On motion of Mr. Eliel, seconded by Dr. Payne, the report was received.

MR. EBERT: If that committee is to be continued I would like to draw their attention to one feature. There is one man that belonged to this Association—he was one of the founders of the Association—who is seemingly forgotten. He is the father of pharmacy

of this country, and that is William Procter. It seems to me, without saying anything against the other men who have lived and worked for the advancement of pharmacy and this Association, that if it is possible for this Association at the time of our fiftieth anniversary to do something to commemorate his valuable work, it would be a grand thing for the Association. There has been no man associated with this organization who has done so much, who has been such a faithful servant of this Association in times gone by, who cared for it to that extent that William Procter did; and I hope in some way when we meet at Philadelphia in 1902, that his memory, above all others, will be brought out in a way to hand it down to the 20th century, because we are somewhat forgetting the grand work that William Procter has done for American Pharmacy.

Mr. Good read the report of the delegates of this Association to the meeting of the National Wholesale Druggists' Association.

REPORT OF THE DELEGATES TO ATTEND THE MEETING OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

To the American Pharmaceutical Association:

The Twenty-Fourth Annual Meeting of The National Wholesale Druggists' Association was held in the city of St. Louis, October 17th to 21st, 1898. It was presided over by President Charles F. Weller, of Omaha.

Of the members of the delegation appointed to present the greetings of the American Pharmaceutical Association, Thomas Layton and J. M. Good were in attendance. They were received in a manner which was gratifying because it was fraternal and cordial.

The greetings conveyed by us were accepted as the good wishes of the older Association to the younger. Delegations from a number of State Pharmaceutical Associations presented credentials. They were cordially received. In the responses and the President's remarks there were reiterated the usual kind words for their customers, the distributors of their wares, the retail druggists. President Weller, in his annual address, dwelt at length and with emphasis upon the necessity of the formulation of plans which would bring the manufacturer, jobber and retailer into closer relations, to the end that harmony might prevail among them.

He referred to the new conditions caused by the war revenue tax, and the consequent rearrangement of prices. While a "branch of the business" he said, "in which we are interested has been called upon to bear more than its legitimate share of the war tax, yet we are glad to say that the drug interests of this country, as a rule, have cheerfully accepted the situation." He further said, "Some manufacturers have shown themselves to be intensely selfish. They have disregarded the protest of the wholesaler, and have paid but little attention to the appeal of the retailer, in advancing prices to an extent unwarranted by the war-revenue tax. As a rule, the retailer is called upon to bear the entire burden. This is not as it should be, and the result is a feeling of antagonism against nearly every standard advertised article on the market to-day." This quotation is made to show the President of the National Wholesale Druggists' Association clearly comprehended the situation, and that he did not hesitate to condemn the action of certain selfish proprietors of patent medicines. The presence in St. Louis of a large body of retail druggists meeting simultaneously with them and the "Proprietary Association of America" invested the situation with considerable interest. The deference shown to the newly-formed "National Association of Retail Druggists" and the disposition to comply with their wishes shown by the other two Associations, did much to relieve the friction unmistakably evident at the outset. The other topics touched upon by President Weller, showed the comprehensive character of the work done by the

Association each year. It included such subjects as, "The Rebate Plan," "The Cut-Rate Problem," "Discount on Proprietary Goods," "Relations of the Jobber and Retailer," "Finances," "Credits and Collections," "The Stamp Tax," "Pure Food Legislation," "The Bankruptcy Law," "Free Alcohol," "Standing Committees," etc., etc.

Throughout the year numerous special and regular committees look after the varied interests of wholesale druggists. The Chairman of each Committee is an active, industrious man. Hearing and discussing reports make up a large part of the volume of business transacted at the annual meeting.

The working hours each day were rather brief. One of the members remarked that he came to St. Louis for complete intellectual rest. Quite an elaborate program of entertainment for the visiting members and ladies was arranged by the hosts and fully carried out.

Hon. C. P. Walbridge, ex-Mayor of the city of St. Louis, is the present President of the Association.

J. M. GOOD, *Chairman.*

On motion of Mr. Sheppard the report was ordered received and referred for publication.

Mr. Kauffman not being present, the Secretary read the report of the Delegation to the American Medical Association.

REPORT OF THE DELEGATION TO THE AMERICAN MEDICAL ASSOCIATION.

The fiftieth annual meeting of the American Medical Association was held in Columbus, Ohio, June 8th to 9th inclusive.

The American Pharmaceutical Association was well represented at the meeting of the section on Materia Medica, Pharmacy and Therapeutics through the delegation appointed by President Dohme, six members being present.

In the absence of the chairman of the section, one of our members, Dr. Stewart, was chosen chairman and presided throughout the meeting. The presence of Dr. Stewart in the chair, and Drs. Lyons and Eccles on the floor gave the meeting a personnel calculated to make a member of the American Pharmaceutical Association feel very much at home.

A number of papers were read which were purely of therapeutic interest, but the greatest number of papers and the freest discussion had to do with the proprietary medicine and the relation of the physician thereto. The opinion was freely expressed that the chief reason for the popularity of "ready made medicines" with the physician is to be found in his, the physician's, lack of pharmaceutical knowledge; and that in turn is due to neglect of the subject of pharmacy on the part of the medical schools.

The discussion of the Pharmacopœia was delayed until the last, and then was cut short for lack of time. The action of the greatest interest to this Association was the passing of a resolution to admit to the next Pharmacopœia "synthetics prepared by patented processes." The vote on this resolution was very indifferent. There were present some thirty members; the resolution receiving ten affirmative votes, no negative; the great majority not voting. It was quite evident that many did not distinguish clearly between this class, and the so called "patent medicine," and were not ready to commit themselves.

There was much in the conduct of the section to commend. The promptness of the meetings, the close attention given papers, the freedom of discussion and the general attention to the business of the section, were all points of favorable note which might be followed with profit.

Respectfully submitted,

GEO. B. KAUFFMAN,

August 14, 1899. *Chairman of Delegation.*

Mr. Kennedy moved to receive the report and refer it to the Publication Committee. Carried.

The Secretary read the report of the Delegates to the National Pure Food and Drug Congress, in the absence of Mr. Thompson, chairman.

To the American Pharmaceutical Association:

Your delegates to the Second Session of the Pure Food Congress, held in the City of Washington, 18 January, 1899, have the honor to report that the Congress was largely composed of delegates representing all the important food, medicine and drink manufacturing industries of the country. The delegates all seemed inspired by the thought suggested by the title of the Congress, and the universally expressed desire was to secure such legislation as would promote honesty among manufacturers and give security to the consumer. Let the label on the package tell the truth so far as the contents of the package are concerned, that he who reads may not be deceived, is what the proposed legislation is intended to accomplish.

The chief motive in calling this session at the time and place it was held was to impress the United States Congress with the imperative need of enacting such a law. Much, however, remains to be done before this desirable end can be attained. The Congress was organized by the re-election of most of its former officers and committees.

Of the delegates and alternates from this Association Messrs. Chas. E. Dohme, H. M. Whitney, A. E. Ebert, A. J. Corning, J. H Manning, Jno. F. Patton, Oscar Oldberg, R. C. Werner, A. J. Schafhirt, E. V. Zoeller and the undersigned, were present. All of which is respectfully submitted. W. S. THOMPSON, *Chairman.*

On motion of Mr. Ryan, seconded by Mr. Hallberg, the report was ordered received and referred for publication.

Dr. Payne read the report of the Committee on Status of Pharmacists in the Army and Navy.

REPORT OF THE SPECIAL COMMITTEE ON THE STATUS OF PHARMACISTS IN THE SERVICE OF THE UNITED STATES GOVERNMENT.

Mr. President and Members of the American Pharmaceutical Association: The success of our Committee last summer in securing legislation which would cause the appointment of pharmacists with the rank of warrant officers in the United States Navy is well known. Although the bill which accomplished this result was passed last summer, it was not until this spring that the appointments were made, as most of the pharmacists of the navy were upon the high seas ministering to the needs of our sailors during the United States naval operations against Spain. The selection of those to fill the twenty-five new places as pharmacists in the United States Navy were made from the naval apothecaries. Those naval apothecaries who have been among the most intelligent and energetic workers for the advancement of the pharmaceutical interests of the United States Navy and of the American Pharmaceutical Association received most of the appointments as pharmacists.

The pharmacists of the United States Navy have been deeply appreciative of the work of the American Pharmaceutical Association for their advancement. They have shown this appreciation in many ways. A large number of them became members of our Association last year, and eight more of them became members of our Association at the present meeting. We have received many, many pleasant letters of acknowledgment and appreciation of our labors from the pharmacists, both of the Navy, Army and Marine Hospital Service; the pharmacist of the flagship of the United States fleet which won the victory at Santiago sent our Chairman, as a memento of that grand victory, a pair of bal-

ances captured from one of the Spanish fleet; and the pharmacist of Dewey's flagship, the Olympia, also sent a souvenir of the destruction of the Spanish fleet in Philippine waters. The pharmacists of the Unitd States Navy also united during the present year in presenting our chairman with a handsome diamond stud as a token of their appreciation of our work done under his direction.

During the present year we have taken steps towards making a vigorous campaign preparatory to bringing our claims for better recognition for pharmacists in the service of the United States government, before the short session of Congress. The opportunity seemed ripe for the work, and conditions appeared peculiarly favorable. The further we progressed in our work, however, the more evident it became that many of our strongest friends appeared to feel that a fight upon the lines that seemed so promising to us might be considered by some as an attack upon the administration. As both the Republican and Democratic parties have worked with us most heartily, and our work has been for the whole people regardless of party affiliation, we felt we could not afford to place ourselves in such a position as to be thought by any one to be conducting our campaign on partisan lines. On this account, as well as the limited time at our command during the short session, we consider it best to defer our chief efforts to the session beginning the first week in December next.

The bill for the general reorganization of the United States army which will come before Congress at the next session in December will afford an excellent opportunity for securing better official recognition for the United States Army Hospital Steward. It is also probable that there will be a complete reorganization of the National Guard some time in the future. If such a reorganization should take place, the opportunity for securing proper recognition of pharmacy as a profession will be one of which every pharmacist must realize the importance, as such opportunities in the nature of the case must be rare ones, indeed such as seldom occur in a life time.

There is a bill to be brought up before Congress this winter which provides for the advancement of all classes of warrant officers; either by oversight or by intention, the pharmacists of the navy who are now warrant officers are not included. It is our intention to secure, if possible, proper consideration of the warranted pharmacists in this bill.

For the coming Dewey reception at New York City, the Manhattan Pharmaceutical Association of New York have arranged a banquet in honor of the pharmacist of Dewey's flagship, the Olympia. To this banquet have been invited all the pharmacists of both Dewey's and Sampson's fleets. This graceful action of the New York pharmacists has been well written up in the New York daily papers, and will aid very materially in attracting public attention to the important duties of the naval pharmacists. It is unfortunate that some of the surgeons of the U. S. Army appear to believe that all medical officers have a complete knowledge of pharmacy, although in a majority of cases they have not studied it at all. When one compares the enormous number of men who die from disease in times of warfare with the few who die from bullets, it would seem that the skill of the physician is more needed than that of the surgeon; and, if this is the case, how important is the pharmacist who knows how to handle and also to dispense medicines properly. The modern pharmacist is an educated, professional man, and in every regiment there should be *at least* one pharmacist who bears a commission. When a regiment needs medicines it requires them immediately, and only a commissioned pharmacist can be able to secure proper consideration from the commissioned officers to assure the prompt carriage of medical supplies to the camps as the troops advance. The attempt to supply medicines under present methods to our army in Cuba during the late war is said to have been a conspicuous failure. The system was at fault. With surgeons who never studied pharmacy nor the handling of drugs, and who lay more stress upon instruments than upon medicines, in charge of the medical supply depots, it is natural to expect that this subject with which they were not familiar was likely to be somewhat poorly

managed. It is a well known fact that practitioners of medicine chiefly prescribe a certain limited set of drugs according to their individual views; the pharmacists are familiar with the drugs of the whole Pharmacopœia and ready to meet the demands and views of all physicians. With a commissioned pharmacist in each regiment, many valuable lives could have been saved during the recent war. In some recent correspondence with a prominent surgeon of the army, this surgeon stated that the chief pharmaceutical duty of hospital stewards was to count out a few tablets, etc.; in cases where this is true it is certainly quite a reflection upon the surgeon's ability to *practice medicine* and *prescribe for disease*. With a commissioned pharmacist in each regiment who thoroughly understands his business, both many lives and many dollars could be saved. A skilled pharmacist knows the best methods of preserving the medical properties and activities of the drugs under his care; the best manner of packing and shipping drugs, glassware, and the other materials for dispensing; what are the usual adulterations found in certain drugs and how to test for them. In times of war these matters have to be *decided quickly*. The plan of having everything go through Washington for intelligent investigation is one which has not proven itself practical in cases of need. An army is organized to fight, and to operate its pharmaceutical needs upon a plan only adapted to times of peace, and not to those of emergency and warfare, is certainly unwise. Supplies must be ready, dying men do not wait for them. Our Committee urged upon the present chief of the medical department of the army the importance of having ample medical supplies with the troops at the very beginning of the concentration of soldiers in Florida and Georgia, before a gun was fired in the recent war. This early advice was met by the declaration that such a procedure was unneccessary, and that the supplies would be handled from Washington with sufficient promptness by the commissioned surgeons in charge of the medical supply depot at that point. The utter failure to keep proper medical supplies with the troops, and the thousands of lives lost in consequence, shows the soundness of the advice offered to our committee. Other valuable services of the army pharmacist would be to test beef for preservatives detrimental to health, and to arrange for an intelligent sanitary disposition of the refuse of the camp, to test the water supply from day to day when the danger of its contamination by drainage is apprehended, to decide when the troops are getting oleomargarine and the government paying for butter, to decide when the soldiers are getting cotton-seed oil and the government paying for lard; to make up medical supplies from any accessible material when the emergency demands them, instead of forcing the surgeons to confine themselves to the meager list of tablets, etc., sent out from the Washington supply depot. These duties, with the analysis of foods and many other matters which I will not take time to enumerate, could be done by a skilled pharmacist, and would be the means of saving many, many valuable lives. Without a commission and a proper salary competent men for such work cannot be secured; the present pay and rank of the Army Hospital Steward does not offer a career which is attractive to an educated, ambitious American pharmacist. The pharmacists of the United States, whether members of our Association or not, have shown their usual readiness to aid in every way in their power to advance the work of our committee. The pharmacists of the whole Union are beginning to realize more fully what can be done by co-operation, and we congratulate ourselves upon the steady success which we have been able to gain. The public are also beginning to understand our wishes and the justice of our claims, and we feel that our prospects for further success are greater than ever. With the large membership which our work has brought to the Association, our labors, instead of being an expense to our organization, have been a source of considerable income. New members who came into our Association last year from the navy added to our yearly income nearly two hundred dollars annually; during the present year eight new members have joined us from the navy, making a total annual addition to the income of our Association of about two hundred and forty dollars.

Respectfully submitted, GEORGE F. PAYNE, *Chairman*.

Mr. Kennedy moved to accept and refer for publication.

Mr. Ebert: I wish to say something which may help the Committee along, and also the Association: At the Chicago Veterans' Association meeting in October last, to assist the Chairman of the Committee, a committee was appointed by that Association to call upon Dr. Nicholas Senn, the noted surgeon, to counsel with him in regard to this status of the druggists in the army. I was one of that committee, and he received us very kindly and gave us this instruction in a few words: "Gentlemen, don't commence at the foot of the ladder, but at the top and go downwards. What you want—and I am with you—is to go to Washington, to the Committee on Military Affairs, and demand that such an office be created as the Chief Apothecary of the United States Army, with the rank of Colonel." The result was that Mr. T. M. Jamison, a former member of this Association, who is now the National Committeeman for the State of Illinois, immediately proceeded to Washington and called to see the President, and consulted him about this matter. The President of the United States said to him, "That is the right thing to do. I am with you. Such a department should be created, and I will give you a letter to Dr. Sternberg; you go and consult with him and see what can be done in the matter." Mr. Jamison took the letter from President McKinley, and called upon the Assistant Secretary of War. He was well received there, and then he called upon the Surgeon-General of the United States Army. Now, I will give you Mr. Jamison's words as he gave them to us when he returned. He said: "I presented the letter of the President to the Surgeon-General. He looked at it; read it—'Glad to meet you, Mr. Jamison. What is your mission?'" After stating what he thought ought to be done, Dr. Sternberg said to him: "I wish to say to you, sir, I am opposed to any such action. There is no necessity for it. We have no use for such an office, and I shall certainly use every effort in my power to see that no such office is created. I have taken care of this office for a long time, and I know what is necessary much better than you, gentlemen, and I think it is not necessary, and I therefore shall oppose it. Good-day, sir!" To this Mr. Jamison replied: "Dr. Sternberg, we will see if there is not a higher power than you are." He then went to Mr. Hull's committee—Committee on Military Affairs—and stated our case. Jamison stated in so many words, "The American Pharmaceutical Association is working in this direction, and I not only wish to represent the American Pharmaceutical Association, but also the druggists of the United States, in this matter." The committee gave him an audience of three hours, and went over the ground very carefully and thoroughly with him, and then decided that it was a good thing, and said they would incorporate it in their bill. They also said they would bring Dr. Sternberg in at the next session of their Committee, and ask him in the presence of Jamison why he objected to it. Jamison stayed over one day for that purpose, but Dr. Sternberg sent word that he was ill, I believe, and could not attend, and didn't attend. Of course, Mr. Jamison's mission was over, and he came back to Chicago and made that report. Jamison said that every member of this Association should, from now on, appeal to the members of Congress for their respective districts, so as to bring this question before Congress at its next session, and he will guarantee to make every effort—because he wants to get even with Dr. Sternberg, I judge—to see that such a position is created. I want to correct one statement. He said that the President did not approve of a Colonel, but was in favor of the office of Major in the United States Army—that the Chief Apothecary should have the rank of Major.

Mr. Ebert's remarks were applauded.

Dr. Payne: We have been running up against a stone wall in this matter, and as we were not an irresistible body, we had to stop. Every Senator and Congressman we

approached in regard to this matter told us to get the approval of the Department, and gave us to understand they could not go against its objection, or act without its approval. I tried hard to get a vote independently of that approval, but could not make it. In the case of Mr. Herbert, Secretary of the Navy, he was not properly approached at first, and he was not favorable to us. You know he is an Alabamian. Well, we had him apologizing down there for a while, and he changed his position. If we adopt the policy that has been suggested, it would be a fight upon the Department, or the Departments of the Army, Navy and Treasury; and I dont think we can afford to do that until we are compelled to do it. Dr. Sternberg told me himself that he was willing to concede an increase of pay in the army; also told me we were not starting right. I told him we were doing the best we could, and would be glad to have advice from him; but he would not give me any suggestion in regard to it. But I think our policy is to do as we have been doing, for we have met with steady, though not rapid, success. It is hard to make radical changes. Of course, if we cannot succeed in bringing about the desired result gradually and peaceably, we will have to do it by force of arms, if we can.

Mr. Hallberg: In a recruiting station in Chicago, the recording officer complained that, while he needed a hundred hospital stewards, he could not get any one to take the place. He said the pay was fair, and that experience was not essential. "We are willing to take anybody," he said, "that we think can be broken in to do this work"—this very responsible work! Just think of it! It is a disgrace and outrage. The service in the war was rotten to the core. The 1cth Illinois went to Chickamauga in charge of a lot of homœopaths! Young boys had dysentery contracted in the morning, with bloody diarrhœa at night, without getting any medicine. I have the evidence to prove it. It was a gross outrage, and I would like to see some protest from this Association against it. How can we afford to have our young boys go into these tropical climes without ordinary medical care?

Mr. Ebert: We are American citizens, and there is no necessity of our bowing to such a fellow, who has lived on the American people too long. I consider that fellow incompetent to protect American citizens, and he has no right to hold the office he does. I think the answer he sent to the American Pharmaceutical Association is an insult, and we should not bear it.

Mr. Hynson: I think the members of this Association would have blushed if they had heard this man try to defend the medical department of the army and navy, as I heard it. At a banquet I attended, it was disgusting to hear him attempt to defend himself.

Mr. Kennedy's motion to receive the report and refer for publication was put to a vote and carried.

The report of the Committee on President's Address was called for, and Mr. Kremers, of the committee, read it as follows:

Your committee, to which the President's address has been referred, desires to submit the following report:

Concerning the establishment of a second National Association of Druggists, your committee is of the opinion that the history of the American Pharmaceutical Association has frequently and amply demonstrated the fact that its strength lies in pharmaceutical advancement along general and broad lines rather than in regulations and control. In the advancement of scientific truth, in the general counsel of educational and legislative problems, in the application of the sciences to the art of pharmacy, this Association has shown its strength and has made a history of which it need not be ashamed. If the

American Pharmaceutical Association has failed in the attempts to establish control over the college, the State Board or the cutter, such as have been suggested from time to time, we need not regret these failures, for the exercise of such control might soon have deprived our organization of its best strength and usefulness. For this reason we should welcome, rather than deplore, the establishment of any organization which permanently —or if history should repeat itself but for a short time—relieves us of the necessity of giving our time and attention (if for no other reason than by way of courtesy), to matters which our Association, by virtue of its character, can never hope to control. With our President we welcome, therefore, the enthusiasm and the *esprit de corps* developed by the National Association of Retail Druggists, and hope that, aiming high, it will be guided by the best economic and business principles and thereby achieve success.

With regard to the first and most important recommendation of our President, your committee, after having given the subject the most careful consideration possible, are of the opinion that the salary of the General Secretary should be raised from $750.00 to $1000.00. Your committee endorses this recommendation not only because this is justly due the General Secretary, but because this Association, in justice to itself, cannot accept for another year the intense labor necessitated by the publication of our Proceedings in three months without some recognition.

With regard to the recommendation that the Committee on Weights and Measures of this Association be requested to appear, either in a body or by a large central committee before both houses of Congress, your committee would recommend that our Committee on Weights and Measures take such steps toward securing favorable legislation as the occasion may present. We would further recommend that the truly practical education in the use of the metric system by the distribution of sets of metric weights by our colleges and universities be urged wherever possible.

Your committee would further recommend that in accordance with the suggestion by the President, a committee be appointed at this meeting to represent the American Pharmaceutical Association at the Convention for the Eighth Decennial Revision of the United States Pharmacopœia.

Finally, your committee would recommend that this Association concur in the recommendation made by the President that, whenever the special interests of this Association do not demand otherwise, the date and place of meeting of this Association be so arranged that our members can attend the meetings of this Association and of the meetings of the American Association for the Advancement of Science without great sacrifice of time and money.

H. M. Whitney,
John F. Patton,
Edward Kremers.

Dr. Whelpley moved to receive the report and take up the recommendations *seriatim*. Mr. Hallberg moved to amend so that when a recommendation was read and no objection made, the reader should go on to the next one. The motion as amended was adopted.

Mr. Kremers read the first recommendation as to increase of the General Secretary's salary from $750 to $1,000 per annum.

There being no comment, Mr. Kremers then read the second recommendation, in regard to securing favorable legislation upon the subject of metric weights and measures.

There was no comment, and he read the third recommendation as to the appointment of a delegation to represent this Association at the Convention for Revision of the United States Pharmacopœia, to meet in Washington City in May next.

MR. REMINGTON: I would simply suggest that we say "Delegates," without naming the number. The Convention settles for itself how many shall be admitted.

Mr. Hallberg moved that this suggestion be adopted. Carried.

Mr. Kremers read the fourth recommendation, as to the time and place of meeting of this Association being arranged, where practicable, with regard to the meeting of the American Association for the Advancement of Science, so that members could attend both meetings without great sacrifice of time and money.

There was no comment on the last recommendation, and Mr. Hallberg moved that the report as amended be adopted. Carried.

Mr. Kennedy moved that the gentlemen whose names were read in the early part of the Session, as approved by the Council for membership, be now invited to become members of the Association. Carried.

The chair announced that new business was now in order.

MR. GOOD: Mr. President, there are some of us who are accused of supporting and defending the Pharmacopœia, which is said to be made up of a catalogue of fossils, and they put us in the same catalogue. (Laughter.) There are others here who are much more progressive, and they are reaching out for everything in sight. The two elements in the Association would have clashed last night, except that they had exhausted themselves previously and their coming together was practically innocuous. We want to be fair to both sides. We recognize that certain criticisms which have been passed upon the Pharmacopœia contain an element of truth. We also recognize that we cannot stand still; and we recognize the advance that has been made in *materia medica*, and we want to go on record in recognition of that fact. So I offer these resolutions, which I think will suit some of us who do not care to recognize in an official way certain articles of *materia medica* which have come very largely into use at the present time—as we will all admit—and therefore I take pleasure in offering the two resolutions in this form:

Resolved, That it is very desirable to increase the scope and usefulness of the United States Pharmacopœia and make it more popular with physicians and pharmacists.

Resolved, That the American Pharmaceutical Association respectfully asks the Convention of 1900 for the Revision of the United States Pharmacopœia to introduce *every feature* that can properly be used to increase the use of the Pharmacopœia by every physician and pharmacist in the United States.

The resolutions offered were seconded by Mr. Sheppard, put to a vote and carried.

MR. RYAN: At the last annual meeting a set of resolutions was introduced and carried, which should have been transmitted to the American Medical Association at the last meeting, but which, through misunderstanding on the part of the Secretary, were sent to the various medical schools of the country instead. The resolutions applied to the use of the metric system. I should like to renew these resolutions, merely changing the date.

WHEREAS, The Metric System of Weights and Measures is used exclusively in the United States Pharmacopœia, and is official in the pharmacopœias of nearly all nations; and, WHEREAS, it has become the almost universal system of weights and measures in scientific calculations; be it,

Resolved, That the members of the American Pharmaceutical Association request the American Medical Association to use its influence with all colleges and schools of medicine recognized by them in the United States to use exclusively the metric system in the

instruction of students, beginning with the classes entering said colleges and schools in the college year 1901.

On motion of Mr. Mayo, seconded by Mr. Main, it was so ordered.

Mr. Sheppard moved that the Local Secretary of the meeting of 1900 be constituted chairman of the Committee of Arrangements, with instructions to appoint the other members of that committee, and report their names to the General Secretary for publication in the Proceedings.

The motion was seconded by Mr. Caspari, and was carried.

Mr. Sheppard offered the following resolution:

Resolved, That the adjournment of this general session shall close the business meeting of the Association, and that the social session as arranged for by the by-laws shall then begin. The social session shall be in charge of the Local Secretary, and when it is closed, in due form the annual meeting of this Association shall end. The Local Secretary shall make a record of the close of the meeting and send it to the General Secretary, to be inserted in our minutes.

Mr. Caspari seconded the resolution and it prevailed.

THE SECRETARY: We have as incidental business the report of the Chairman of the Council on the funds of the Association. There is no special place assigned for it in the order of business, and as it has been overlooked up to this time, it might be considered here.

The Secretary then read the report, which was as follows:

REPORT OF THE CHAIRMAN OF THE COUNCIL ON THE FUNDS OF THE ASSOCIATION.

The investments and cash belonging to the several funds of the Association, in possession of the Chairman of the Council at the close of the fiscal year, June 30, 1899, consist of

EBERT FUND.

1 U. S. Registered 4 per cent. bond, No. 160,603, for	$100 00	
1 U. S. Registered 4 per cent. bond, No. 67,880, for	500 00	
1 U. S. Registered 4 per cent. bond, No. 2,125, for	100 00	
		$700 00
Cash in bank at last report	$60 73	
Received during year	29 47	
	$90 20	
1898.		
Sept. 20, Paid award to V. Coblentz	28 00	
		62 20
1899.		
June 30, Balance in Savings Bank, Dover, N. H.		62 20

CENTENNIAL FUND.

1 U. S. Registered 4 per cent. bond, No. 145,640, for	$1000 00	
1 U. S. Registered 4 per cent. bond, No. 160,604, for	100 00	
1 U. S. Registered 4 per cent. bond, No. 2,126, for	100 00	
1 U. S. Registered 4 per cent. bond, No. 2,127, for	100 00	
		1300 00

Cash in bank at last report	$147 58	
Received during the year	56 47	
1899.		
June 30, Balance in Savings Bank, Dover, N. H.		204 05

LIFE MEMBERSHIP FUND.

Eleven (11) U. S. Registered 4 per cent. bonds, each for $1,000.00 (Nos. 145,639, 145,671, 145,672, 150,826, 150,827, 150,828, 164,-185, 164,889, 173,049, 185,893, 202,591)		11000 00
Cash in bank at last report	$1273 69	
Received during the year	442 99	
		1716 68
1898.		
Sept. 27, Paid for U. S. Bond, No. 202,591	$1107 50	
1899.		
June 30, Balance in Savings Bank, Dover, N. H.		609 18

GENERAL FUND.

Six (6) American Security & Trust Co.'s 4 per cent. debenture bonds, each for $500.00 (Nos. 94, 95, 96, 97, 98, 99)	3000 00

The interest on this fund is paid to the Treasurer of the Association.
All interest paid to date.

W. S. THOMPSON, *Chairman of Council.*

Upon motion of Mr. Main the report was ordered received and referred for publication.

The Secretary read the following letter from John U. Lloyd in regard to the Lloyd Library:

THE LLOYD LIBRARY.

During the past year pharmacists, botanists and chemists have made liberal use of the contents of this library, which, as is well known, is open to all who care to consult it. The librarian, Dr. Waldbott, has made many researches for those who could not visit Cincinnati, and has supplied desiderata to persons both in America and abroad. It is particularly gratifying to observe that pharmacists and others are now donating to its shelves many odd volumes and pamphlets as well as accumulations of old books that connected with the art of pharmacy are of no particular use other than in a library of this description, where every pamphlet or leaflet has a place. The library still lacks many numbers of the State Pharmaceutical Proceedings, and a request is hereby made to our members to assist in completing the files. During the past year many valuable donations have been made. Particular mention may be made of the donations of the late Mr. A. C. Tufts, Dover, N. H.; Mr. A. G. Vogeler, "Western Druggist;" D. O. Haynes, "Pharmaceutical Era;" E. J. Kennedy, "Pharmaceutical Era;" Prof. C. Lewis Diehl; Prof. Chas. T. P. Fennel; Dr. R. G. Eccles, and the Secretaries of the State Pharmaceutical Associations.

In closing it may be again stated that this library is free to all who care to consult its shelves, and by both will and legal action has been donated by its founders to the cause of scientific education. Its final resting place will be in the educational institution where it can be of the greatest use to the greatest number.

JOHN URI LLOYD.

Applause followed the reading of the paper.

On motion of Mr. Sheppard, seconded by Mr. Hallberg, the communication was ordered to be received and referred for publication, and the thanks of the Association tendered Mr. Lloyd.

THE SECRETARY: I might say in connection with this matter that, while I was not told so by Prof. Lloyd, one reason for this communication is probably the fact that the Association placed all its books in the care of his library a few years ago, and no doubt Prof. Lloyd feels that the Association takes an interest in the library, and therefore makes an annual report on this subject.

MR. SHEPPARD: I would call attention to one point in that letter which I know Prof. Lloyd is concerned about, and that is the reports of the various State Associations. They have great difficulty in getting back numbers of the Association-meeting reports, and I hope we will all try to supply him with old numbers of such reports.

Dr. Stewart offered the following resolution:

Resolved, That we express our hearty appreciation of the courtesies extended us by the Mayor of Put-in-Bay Island, in giving us the freedom of the Island during the meeting of the American Pharmaceutical Association; to the Cleveland pharmacists who entertained us so royally in the Forest City; to the genial Local Secretary, Mr. Lewis C. Hopp; the proprietors of the Hotel Victory, and to all others who have made our stay here so pleasant and profitable.

The resolution was seconded by Dr. Whelpley and carried.

MR. ELIEL: I desire to give notice that, at the meeting next year, I shall introduce a resolution in regard to new editions of the National Formulary, to the effect that all privileges regarding the publication of same in any text-book shall be prohibited, unless a compensating royalty is paid to the American Pharmaceutical Association. I simply desire to give notice that such a resolution will be offered at the next annual meeting.

The chair announced that the installation of officers was now in order.

Mr. Sheppard moved that the Convention proceed to the installation of the President-elect and the Vice Presidents-elect. The motion was seconded by Mr. Hallberg. Carried.

The chair appointed Dr. Eccles and Mr. Eliel a committee of two to escort the newly-elected President to the chair.

When these gentlemen had performed that duty, Dr. Eccles said:

Mr. President, I have the honor to present to you the incoming President of this Association, Prof. A. B. Prescott, of Michigan, and hope that he will receive all the honors of the Association, and that when he receives from yourself the gavel, Mr. President, you may receive the hearty thanks of this Association as you retire from office. (Applause).

The President said:

Prof. Prescott, it gives me great pleasure to introduce you to this Association as my successor in the office of President of the American Pharmaceutical Association. Your name, and your noble work in the cause of pharmacy and chemical research, are so well known to all—and especially so to this assembly—that it would, indeed, be carrying coals to Newcastle to make mention of them here. Your works and contributions to the

pharmaceutical profession are spread over the journals of the country for twenty-five years past, and are known not only to members of our profession, but to men of science throughout the civilized world. To be able to select a man of your attainments and fame for the office of President of this Association is an honor to it. To be President of this great Association is an honor to any man. (Great applause.) I trust that your experience as President may be as pleasant as has been mine throughout the past year, and that in transferring this badge of office to you you may wear it with distinction. I trust that when your term as President expires, as mine does now, you may bear with you the desire of this Association that it might have continued, and that the plaudit, "Well done, good and faithful servant," may follow you. Sir, I tender you the gavel of office. (Long applause.)

Mr. Prescott replied:

Mr. President, and fellow-members of the American Pharmaceutical Association, in reply to these very kind words of your presiding officer I can only say, that it is my first and chief duty to perform the duties of this chair for the next year so that I may be no obstruction to the important business that will come before you. I know well that the Council of this Association—the practical and efficient governing body, the cabinet, the supreme court; yet, withal, a most representative body in the executive work of this Association—relieves its presiding officer of what would otherwise be responsibilities too great to be borne; but I ask the co-operation and the helpful aid of every member of the Association in my discharge of the duties of the chair necessary to be performed in the general sessions, and in all the functions of your President's office under your constitution. I ask your forbearance, also, that we may proceed with the greatest harmony and do our work well. The work for the coming year is especially important—momentous even—not only to ourselves, but to our country. I am more and more impressed with the value, the necessity, of the work of this Association for the good of the public, for the discovery of truth and for the advancement of mankind. The harmonious union of all the interests of the Association should be our first thought, and should be ever in our minds. I honor this Association. I should like to speak to every pharmacist in the United States to-day in regard to this Association, and ask him to join with it in the noble work before it. With this appreciation of the great work, and the wide scope, and the important functions of this Association, you may well understand my high sense of the honor you have conferred upon me. I desire to make acknowledgments to the Committee on Nominations for having placed before you the name of one engaged in a branch of pharmaceutical education—one of the divisions of the work of this Association; and I desire to thank them very heartily—and the members of this Association—for the personal trust reposed in me in bringing me to this office. I thank you all, and I look forward to a year that shall be pleasant and profitable for us; and to the meeting to come, where we hope to have a large number in attendance. No small part of the good of this Association lies in the friendships we knit together at these meetings, and the acquaintance we have with one another. So let us hope that we may come together in larger number at Richmond, and that we may have a strengthening of the ties that bind us together. Gentlemen, I thank you again. (Prolonged applause.)

Dr. Eccles introduced the First Vice-President elect, Mr. C. Lewis Hopp, and said:

Mr. President, I have the honor to present to you here our new First Vice-President. In our new President we have a man that is known throughout the world for his scientific attainments, with a reputation as wide as civilization itself. In our Vice-President we have a man known widely and well as a working pharmacist. With science at the

head, and a practical, working pharmacist alongside of him, we ought to have a prosperous year.

The President said:

Mr. Hopp, it is with a great deal of pleasure that I have this opportunity of congratulating you and the Association upon its happy selection for First Vice-President. I recollect very vividly, gentlemen, when first I met Mr. Hopp. It was on our excursion to the Pacific, when we met there some years ago. I well recall the agreeable impression he made on us as a gentleman and as a wide-awake pharmacist. Since that time I have met him frequently, either as a member of the Council, or of some important committee, or as a member of this Association merely, and he has ever been a very active worker in our cause, with sympathy for our aims, and it is such men we want to honor. He has also been very active in his duty here of entertaining us at Put-in-Bay, and we owe a great many happy hours to him. I trust that, with such aid as Mr. Hopp can give us in his new office, we may *Hopp* very gracefully into the new century. (Applause and laughter.)

Mr. Hopp responded as follows:

Mr. President, and fellow-members of the American Pharmaceutical Association, I sincerely thank you for the high honor conferred on me in electing me First Vice-President of this Association, and, although the office is purely one of honor, I am at your service if you need me. I am proud of being a member of the American Pharmaceutical Association, having attended its meetings for the first time in 1876. I am more than proud to know that I am associated with men that are the peers and pillars of American pharmacy; and I shall look forward to the time of holding our next meeting with great interest, as a time when I shall meet you all again. The pleasure of the anticipation is such that I cannot describe it in words. Now, it will only be a short time until we shall separate and go to our respective homes, and I hope that you may leave us with pleasant recollections of the Put-in-Bay meeting. (Applause.)

Dr. Eccles introduced Mr. Dewoody, Second Vice-President elect.

The President: Mr. Dewoody, as I have already stated to Mr. Hopp, you are one of the "Old Guard," and have been with us on many occasions and have come a long distance, each time to show your interest. I am sure this mark of appreciation of your attendance and of the well-performed duties that have fallen to your lot will be appreciated by you, as the Association has shown its appreciation of your merits.

Mr. Dewoody: Fellow-members of the American Pharmaceutical Association, I had thought that this occasion would furnish me the only opportunity I would have to talk without being shut off by Brother Hynson and Brother Hallberg—that they couldn't touch me here. (Laughter.) Now I am where I want to be (laughter); but unfortunately I find that I cannot stay here, for there is mighty little use for a Second Vice-President except to be quiet and be good. My well-known qualities have secured me this position, but now I am going to give them up. (Laughter.) I hope the prayers and good-will of the members will follow our distinguished President and our First Vice-President for health and long life, for if I ever get that gavel it is a wrecked Association. (Laughter.) I find myself in the fix of the fellow that tried to talk against a band. I cannot talk against the dinner-bell, and we all know instinctively at this hour that it is about time we were in the other room, and I would like to invite the Asssociation to refreshments with me. (Laughter and applause.) Gentlemen, I thank you for the honor conferred.

DR. ECCLES: On behalf of Mr. Gray, of Montreal, who is unable to be present to be introduced as your Third Vice-President, I have the honor to present to you his dear friend who nominated him for that position, Dr. Reed. He will have something to say about Mr. Gray. In this way we unite Canada with America, and make this truly an American Pharmaceutical Association, instead of a United States Pharmaceutical Association.

THE PRESIDENT: I am sure the selection of Mr. Gray for Third Vice-President was one that came from the heart. I am satisfied Mr. Gray will be an officer we shall all appreciate. I am glad to recognize Dr. Reed to respond for him.

DR. REED: Mr. President, it is an unexpected honor that I should have to speak here to-day in the place of my friend—and at one time fellow-clerk—Mr. Gray, of Montreal. I suggested his name for this office for certain reasons. In the first place, he is a gentleman who has had thirty-two years of successive membership in this Association. And then I am glad you have recognized Canada in giving Mr. Gray this office of honor. We in Canada estimate very highly the American Pharmaceutical Association, and I know Mr. Gray has been a most enthusiastic advocate of the Association. He frequently refers to it, and we look on him there as the representative pharmacist. He has been forty years on the same street, and is a retail pharmacist, pure and simple, and goes down to his business every day. I hoped to bring him with me on this occasion, but he could not come at the last moment. I thank you on his behalf for the honor conferred, and I thank you for Canada as well.

On behalf of myself I want to say that it has been a great pleasure, indeed, to meet the members of the Association here. I formed the acquaintance of a great many of them in 1896, in Montreal, and have met them since then with the greatest pleasure. A long time ago—according to the story books—a young man in this district gave a very warm reception to certain parties from the other side of the lake, from the district I have the honor to represent. The reception on that occasion, unfortunately, was warm to excess—warmer than necessary, in fact. (Great laughter.) But I am glad to be able to say that, before the century is closed, I, as an English citizen, have come to Put-in-Bay to Victory! Victory! Hotel Victory! (Applause.)

Dr. Eccles presented the new members of the Council—Dr. Whelpley and Mr. Eliel, and referred to the retiring President in the chair as the third member, and said that the old officers of the Association who had been re-elected were too modest to appear.

Mr. Dohme, before leaving the chair, said:

I want to thank you, one and all, officers, Council and members generally, for the sympathy and assistance given me and for the kind indulgence shown to my weak efforts to preside creditably over this assembled body. I have tried my best to further the interests of the Association. During my career of nearly thirty-seven years of membership in this Association it has naturally grown into my heart, and I take as much interest in its affairs as I do in my own. I trust my parting from you will be one of pleasant memories with you all. I certainly have fully appreciated the honor conferred upon me in my election as President last year. (Applause.)

Mr. Prescott, the new President, took the chair.

Mr. Mayo moved that the President appoint delegates to attend the meeting of the National Association of Retail Druggists, to extend fraternal greetings. Mr. Dohme seconded the motion and it prevailed.

THE SECRETARY: I think it is desirable, Mr. President, that, before adjournment, we should put ourselves on record in regard to one matter. It is not known to every one present, perhaps, that the hotel company has done a very courteous thing in complimenting some of the officers of the Association, the President, Treasurer and Secretary, with free entertainment while here; for themselves and their ladies. Inasmuch as this is money saved to the Association so far as the personal expenses of the Treasurer and Secretary are concerned, the Association paying these ordinarily, I think the Association should make proper acknowledgment of this courtesy, and I move a special vote of thanks to the hotel management accordingly.

The motion was seconded and carried.

The Secretary moved that the President appoint a delegation to visit the National Wholesale Druggists' Association at its next meeting at Niagara Falls in October, to extend the fraternal greetings of this Association. Seconded by Mr. Mayo and carried.

Mr. Kraemer moved that a vote of thanks be tendered the retiring President, and other retiring officers of the Association for their faithful work. Seconded by Mr. Lyons and carried unanimously.

On motion of Dr. Whelpley, seconded by Mr. Dohme, the Association then adjourned. CHAS. CASPARI, JR., *General Secretary*.

ELEVENTH SESSION—MONDAY MORNING, SEPTEMBER 18, 1899.

The President being absent, the Association was called to order at 10 : 30 o'clock by First Vice-President Hopp, in accordance with a resolution adopted at the tenth session.

In the absence of the General Secretary the Vice-President appointed Prof. Jos. Feil Secretary *pro tem.*

No new business having been presented, and the social session having been concluded, it was, on motion of G. L. Hechler, seconded by Geo. W. Voss, agreed that the Association do now adjourn to meet again at Richmond, Va., in the month of May, 1900.

JOS. FEIL, *Secretary, pro tem.*

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION—TUESDAY, SEPTEMBER 5, 1899.

The first (and only) session of the Section on Commercial Interests was called to order about 4 o'clock p. m., immediately succeeding the third general session of the Association; and on motion of Mr. Sheppard, who called attention to the fact of the absence of both the chairman and secretary of the Section, Mr. Dohme, by virtue of his office as President of the Association, took charge of the meeting until a temporary chairman could be elected.

Mr. Sheppard then said:

Mr. President: I would like to nominate for temporary chairman of this Section the gentleman who has just read to us a very valuable paper before the general session—the honored President of the National Association of Retail Druggists. The interests of the association over which he presides and the interests of the Commercial Section are identical. We desire to obtain the same result, namely, the commercial benefit of the retail druggist. I take pleasure, therefore, in nominating for the office of temporary chairman our friend and fellow member, Mr. Henry P. Hynson, of Baltimore, not only for his ability to preside over us, but for the special reason that we thereby bring together the American Pharmaceutical Association and the National Association of Retail Druggists.

The remarks of Mr. Sheppard were greeted with hearty applause.

THE ACTING CHAIRMAN (MR. DOHME): I gladly put the question in this sense, and will ask your consent, to the election of Mr. Henry P. Hynson as chairman of the Commercial Section, in the absence of all the officers of the section.

Mr. Thompson seconded the nomination made by Mr. Sheppard, and Mr. Hynson was unanimously elected chairman *pro tem.* of the Section.

Mr. Hynson took the chair and spoke as follows:

Gentlemen: Ordinarily you would have heard enough of me in the last hour. I may be permitted to say that I do not feel any great personal pride in having been elected temporary chairman of this important Section, though, after all, it may be largely due to your partiality, which I appreciate. I feel that it is a recognition of the Association over

which I have the honor to preside—an association created for strictly commercial purposes. It is out for business, gentlemen, nothing else. The idea that prompted it was, that there was need that the pharmacists of this country should be represented by a delegate body. No criticism, no antagonism was thought of with regard to the American Pharmaceutical Association, but its very constitution prohibited it from acting as a delegate body. You can readily see that 40,000 druggists could not be actually represented by an association the membership of which was made up of individuals. But it was possible for the druggists of this country to be represented in a general body by delegates sent from local organizations, and it was with the idea of having some central organization in which the druggists could meet and express their feelings on the course of commercial matters that the Association was formed. Before this Association here we have no apologies to make, but much to be proud of. Those who were at the meeting at St. Louis when the National Association of Retail Druggists was organized will remember that that body was made up of strictly representative men—men that were a credit to the profession of pharmacy and a credit to the business interests of this country. I do not hesitate to say so. And if it was not a serious matter I would tell you why I was elected President—it was simply to get me off the floor and keep me quiet. (Laughter.) It is no index to the character of the Association. The commercial interests of the pharmacists *per se* are of paramount importance. There is no doubt about that. We must have the substance to build from. The substance for the colleges comes through the work of the retailer. The profession of pharmacy must come through this commercial, this material work of the retailer. So we are all directly interested in the success of the retailer. I must express my pleasure to feel that the same kind of feeling that was evidenced toward this Association at St. Louis—which was hearty, sincere and entire—is reciprocated by this Association. The American Pharmaceutical Association there was granted a special privilege- was declared entitled to five representatives on the floor of the Association. You are entitled to delegates there as no other association is. The American Pharmaceutical Association was the first in the hearts of the pharmacists of this country. I will not pretend to take the place of the distinguished chairman of this Section. I could not do it after years of labor, and certainly on the spur of the moment I will not try to do so, but will try to be fair in conducting the business of the Section. My first pleasure will be to introduce to you a gentleman who does really represent the National Association of Retail Druggists. By the peculiar constitution of the Association, the President is simply presiding officer. The Executive Committee is the real power, and the chairman of that committee is Mr. F. E. Holliday, and I present him to you. (Applause.)

Before Mr. Holliday took the floor to respond to his introduction, on motion, Mr. Charles A. Rapelye, of Connecticut, was put in nomination for temporary secretary of the Section and unanimously elected.

Mr. Holliday then said:

Mr. President, and Members of the American Pharmaceutical Association: It gives me great pleasure to address this Association—this Section, with a Chairman and a Secretary whom I know very well, in connection with the organization of whose Executive Committee I chance to be Chairman. No one was much more surprised than I, after the four days' hard work we had in St. Louis last fall, to find that the Executive Committee would have to carry the burden for the year to come, and that I, as Chairman, with a scattered committee, would have to bear the brunt of the work. Had I known then as much as I do now, I think I should have escaped.

I wish to congratulate this Section on the selection of its temporary chairman—a man who is our President, and a very valuable man to our Association.

Coming here to-day without knowing what would be expected of me, I am not prepared to make a speech; but I will say something of the work of our Association during the year. You all know more or less of it, of course; but perhaps you do not know that all of the State pharmaceutical associations of the United States who have held meetings since October last, with two exceptions, have endorsed the organization of the National Association of Retail Druggists, and we hope that they may be represented at the October meeting in Cincinnati. We have the adhesion and co-operation of about one hundred local organizations. A great many of these are in the large cities. Some in the larger cities are not complete as yet. It may surprise you to know of the interest taken in the larger cities. Take the city of Philadelphia, for instance, with something like 680 registered pharmacists—Philadelphia and vicinity; they now have something like 460 who are working hand in hand in the local work. About the same percentage obtains in Chicago. In St. Louis they are together; and most of you know what we have in Pittsburg and Louisville—a solid, united front, with the exception of one or two aggressive cutters. The department stores we all recognize. We do not have to speak of them.

I have been asked what we have accomplished during the year. What I had in view personally at the close of the St. Louis meeting was to do all we could that would show immediate results—try to help each organization and the country at large. But what I wanted to do was to perfect the local organizations. We are satisfied that our work can only be accomplished through getting local organizations, large and small, established in the different localities, towns and counties—in some cases, three or four counties together. When that is done, they can take care of a great many local troubles that the national organization cannot reach. And while, perhaps, we may flatter ourselves, we think the work has been well done for the length of time we have been in existence.

The success of the Cincinnati meeting, which occurs four weeks from now, is assured. We will have a good meeting. The country at large will be well represented. Then, if we have made any mistakes, they will come out. We hope every locality will be represented, and we want to be set right if we are wrong in anything. I hope to see a delegation of five members sent to the Cincinnati meeting from this Association. I am not a member of the American Pharmaceutical Association, but I am an old druggist of thirty years' standing, and when the matter, referred to by Mr. Hynson, of allowing a representation of five delegates from the American Pharmaceutical Association came up at St. Louis, I was very much in favor of it.

We want the solid co-operation of every one concerned in the drug business, whether a retailer or not. It makes no difference whether a man is a retailer, a manufacturer, a wholesaler, or a professor in a college of pharmacy, the success of every one of you depends upon the success of the retail druggists of the United States. (Applause.)

We have done the best we know how. Come to see us at Cincinnati, and we will do the best we can. I thank you, gentlemen, for your attention; and if anything with reference to this matter comes up later I will be glad to give you any information in my power. (Applause.)

MR. HYNSON: It seems to me it would be fit and proper for the President of the American Pharmaceutical Association to say a few words of welcome to Mr. Holliday, in view of his presence here, the remarks he has made, and his official connection with the National Association.

MR. DOHME: On behalf of the American Pharmaceutical Association, I gladly take the opportunity of thanking the gentleman who has just spoken, particularly as we have been enlightened as to some of the objects of the National Association of Retail Druggists. The object of our Association is heartily in sympathy with the aims and purposes of the Retail Association. We feel for you, and as we have last year sent a delegation to ex-

press our sincere sympathy with your move in the direction taken, I am sure we shall be glad to do so again, and send an active committee to assist you in any way they can, and to show you that this Association takes an interest in your work. We are very happy to have the gentleman with us.

MR. HYNSON: It occurs to me that much of the credit of the organization is really due to your delegates. No one helped us so much in the organization as your representative there, Mr. Good. I hope he will give us a word as to what he did there.

MR. GOOD: I hardly think it would be modest for me to accept the chairman's estimate of the value of my work at St. Louis without a protest. He has given me entirely too much credit. It was my pleasure to be present at the organization of the National Association of Retail Druggists. Your President asked me to be present and present the greetings of the American Pharmaceutical Association, which I did as well as I knew how. It may possibly be of interest to give you the reasons that I gave them why there could be no jealousy on the part of the new organization toward the American Pharmaceutical Association, or on the part of the latter Association for the new organization. I tried to point out to the gentlemen there present that what had been done for the retail druggist in the past few years had been done by the American Pharmaceutical Association. This Association had seen the National Retail Druggists' Association come up and flourish very vigorously for a while, and then pass out of existence. It was really absorbed by the American Pharmaceutical Association, when the Commercial Section was established. It had run far enough for the gentlemen who had been active in it to become somewhat discouraged, and not seeing any outcome for an independent organization of that kind—any work for them which could not be accomplished by a Commercial Section in the American Pharmaceutical Association—it was abandoned and a Commercial Section established in this Association. The Inter-State Retail Druggists' League, which was also formed in St. Louis, started out very vigorously, and did good work for two or three years, but it finally gave up in despair. The Commercial Section of this Association has, perhaps, not been a conspicuous success, and that was the excuse, no doubt, for the formation of this new organization. But yet it offered the opportunity—the American Pharmaceutical Association did—for the man interested solely in the commercial side of pharmacy. It was not the fault of the American Pharmaceutical Association that the representative body assembled there on that occasion had not come to our meetings and taken full and active possession of the American Pharmaceutical Association. It was not the fault of this Association, and that I tried to show. The American Pharmaceutical Association was there in the person of myself as a delegate, to bid them God-speed in the good work and to assure them of our sympathy. That was my duty as a representative appointed by the President. But while I was simply there as a delegate to present the greetings of this Association, there were occasions when words of explanation from me as to the attitude of the American Pharmaceutical Association did some good, I think. I was there, fortunately, in a dual capacity. I was sent there as a delegate from the St. Louis Apothecaries' Association as well, and was, of course, a working member at the meeting; and having, perhaps, had more experience in organizing such associations than many of those who were present, I was able—according to Mr. Hynson's estimate—to help some in the organization, and I was very glad to do so.

The memory of those sessions for the organization of the National Association of Retail Druggists has remained with me vividly throughout the year. I shall not soon forget my impressions as I stood up before that gathering and faced that set of men. It was really impressive. They were, I considered, thoroughly representative men—men of intellect, and men who knew why they were there and intended to accomplish something before they went away.

In my report as Chairman of the delegation to visit the National Wholesale Druggists' Association, I make some allusion to this meeting, not knowing that I would be asked to say anything about the National Association of Retail Druggists; indeed, we did not know there would be any opportunity to do so. I make a mere allusion to it in my report, and perhaps it would not be improper for me to elaborate a little on what I saw there:

Three associations met in St. Louis at the same time. The two regular organizations, the National Wholesale Druggists' Association and the Proprietary Association of America met there at that time, and the presence of a body of retailers coming there for the purpose of forming a new organization gave special interest to the occasion, as you can imagine; and it was very gratifying, indeed, for us to see the consideration which was given the retail druggists by the other two organizations. They were kind to us in every way, and showed that they desired to co-operate with us in any measures which seemed at all reasonable or feasible. And, as I said, the body of men there called together was not likely to make any serious mistake, and the various propositions discussed for perfecting the relations between the different bodies were gone over fully with committees from the other associations, and before we separated they were approved. It must not be supposed that we forced ourselves upon them. They came to us. The first communication between us and the National Wholesale Druggists' Association was from a special committee appointed by that association to visit us and invite us to visit them as a body. The invitation was accepted, and the episode of our march into their convention-hall was a very pleasant one—it was a good thing to see it. Our reception was exceedingly cordial.

On the formation of this new association there was a chance to make a mistake, but the opportunity in that respect was avoided. At the outset, it occurs to me, it was an exceedingly happy idea to make it an association to consist in the meeting of delegates from other associations—to make it a delegate body, and not a membership body, as our Association here is, and very properly so. The work of such an association can be accomplished by picking out from local associations their best men—as it was apparent they had done at St. Louis—and sending them to these annual meetings. These men there at St. Louis were speaking for fifty or a hundred men at home. We have here in the American Pharmaceutical Association a membership of between 1200 and 1300, I believe, but we who attend these meetings cannot always speak for the great body of its membership—we think we do, but sometimes we do not. But even supposing we did speak for the entire membership, it is only for 1300 men, instead of the 40,000 retail druggists in this country. So, at the outset, I thought it was wise that the delegate plan of organization was adopted. And the constitution and by-laws which were adopted will, I think, appeal to you as being good—although Mr. Holliday here may have discovered some little weakness in them which he may propose to have remedied next month. But, altogether, when we separated we felt that we had done a good work. Whether or not it will continue, whether it is simply the impetus which enthusiasm gives to a new organization, is a question we cannot determine to-day, of course; but certainly it has received a great impetus, and unless some unforeseen troubles confront the organization, it must succeed. I think it will succeed. There are, as you know, likely to confront the association obstacles in the way of evil enactments, and other things. That is something we need not dwell on now, however. We have had a little experience in that line out in Missouri, and, if it is desirable to discuss these things, that is a matter that can come up later.

Gentlemen, I thank you for your attention. (Applause.)

MR. HYNSON: Before we proceed to transact any further business, I should be pleased to entertain a motion to allow Mr. Holliday the privileges of the floor.

On motion of Mr. Main, the suggestion was adopted.

MR. HYNSON: I believe Mr. Jones is a delegate from the National Association of Retail Druggists, and is a member of the American Pharmaceutical Association. We will hope to hear from him a little later. I am now ready to entertain any motion appertaining to the business of this Section.

MR. DOHME: The Chairman of the Section, Mr. Jacobs, has telegraphed that the documents are on the way, but they have not been received as yet.

MR. SHEPPARD: I want to suggest that there is one corner of the United States in a very happy condition, and that is a part of the State of Vermont. It is a pretty good place to live in, and we have with us at this meeting the President of the Vermont Pharmaceutical Association, of Montpelier, Mr. Wm. E. Terrill, and we should be glad to hear from Mr. Terrill on the conditions in his State. They are somewhat different from what they are in the large cities.

MR. HYNSON: We will be very glad to hear from Mr. Terrill.

MR. TERRILL: I was talking with Mr. Sheppard coming out here about the trade in our section, and I told him the druggists would get together there in my town some time in the spring—every druggist in the city—and fix prices, and then they would be lived up to. As far as I know there has been no deviation from them. We get full prices. For Warner's Safe Cure we get $1.25, and for Fellows' Spirit of Hypophosites on prescriptions $1.50. I have been in business for myself seven years, and the prescription business at the present time is at least five times what it was five years ago, and we lay that to the tablet triturates. Pills we dispense very few of; hardly put up one prescription a month for them. Tablets are in the lead. The section around us, of course, is like any other permanent community. The country stores sell patent medicines—the leaders—and we have opportunity to see these people quite frequently, and find they are getting pretty nearly full prices, so they do not affect our trade much. Only fourteen one-dollar preparations are cut at all, and for these dealers get ninety-five cents. It seems to be the desire of the dealers to get as near full prices as possible, and we do not know much about cutters and department stores.

MR. SHEPPARD: How many department stores are there in Vermont?

MR. TERRILL: Only one, and they carry no patent medicines at all. We have a State Association of 141 members, about, and had 42 at our last meeting.

MR. GOOD: There are certain details whereby the work of the National Association of Retail Druggists must be accomplished, of course, and there are certain things we wanted to ask of the Proprietary Association and of the Wholesale Druggists' Association, very pertinent requests to be made of them as to how certain business should be handled; and these requests made by the National Association of Retail Druggists were acceded to. I hope Mr. Jones will feel at liberty to enter into some explanation of the details of the workings of the National Association of Retail Druggists. I can readily see that what has been said to the members here so far gives to them no practical idea, no real idea, of the practical working of the National Association, and I hope Mr. Jones will do this.

MR. HYNSON: I think it should be said to the credit of Mr. Holliday and myself that we have stated that the work of the National Association has been done by local organizations through their delegates in a delegate body. They are there confronted with each other, and come to conclusions which are based on their best judgment as to the

welfare of the people they represent. That being the case, we had better, I think, begin at the foundation and learn something about the local organization. It is very fortunate for the National Association of Retail Druggists that it has had an ideal local auxiliary in the local association Mr. Jones, of Louisville, represents, and I hope he will tell us something about his local organization.

MR. JONES: Mr. Chairman and Gentlemen of the American Pharmaceutical Association, I do not claim to be an exceedingly good organizer, but only that my heart and soul were enlisted in the cause of the National Association of Retail Druggists, and that I went to work with that idea, and that my time, my money, and everything else were put into it. I did not ask my friends to put up a dollar. They did reimburse me to some extent, of course. I went as a delegate to the organization of the National Association of Retail Druggists, and subsequently to the meeting of the Western Proprietors' Association, and after that to the meeting of the Proprietors' Association at Chicago, all at my own expense. But as I said at the outstart, my heart and soul were in this enterprise. I am not dependent on the retail drug business, but my sympathy with every one engaged in the business is so great that I would willingly make almost any sacrifice to see their interests advanced. We come here now with the sole idea of having the endorsement of the American Pharmaceutical Association. I am a member of this Association, and have been for years, and I think it should endorse every move that has been made by the National Association of Retail Druggists, because we ask nothing except what is reasonable.

After the adjournment of the meeting at St. Louis I addressed a letter, at my own instance, to every proprietor whose name I could find, asking him whether he would adhere to the principles laid down by the National Association of Retail Druggists, and outside of the Lambert Pharmacal Co., of St. Louis; the Potter Drug and Chemical Co., of Boston; and the Paris Medical Co., of St. Louis, we got letters saying they would, as far as Louisville was concerned. Then I asked the National Secretary, Mr. Wooten, to do the same thing for the Association, so they would endorse what we had done. Shortly afterwards I saw shipments of Payne's Celery Compound and Wampole's Oil in front of a certain store in Louisville, and had reason to believe they were sold by the firms direct, and not through the jobbers as had been agreed, and I wrote to the manufacturers about it, and they denied selling to the party—a retailer. Then I went around to the store and asked the proprietor if he would not show me the invoice of these goods, and he wanted to know how I knew about it, and he refused to show it to me. But he did it, and I wrote to both Wampole and to Payne's Celery Compound people. I got a nice letter from the Payne people saying that hereafter these things should not occur. I got a letter from Mr. Wampole saying the thing had occurred through mistake, because the man said he was a wholesale and retail dealer, and the error occurred in that way. After a meeting of our Association we told them we would excuse them that time, but it must not occur again. Since that time they have never repeated the offense to our knowledge. We have had a great deal of trouble with the Paris Medicine Company; we took up the matter with the proprietor and he said that his business had been made by the retailer, and he wanted to accommodate him in every way possible, and he said "if you can show me how I can do this thing legitimately, I will do it." We told him we didn't want to interfere with his business so long as he sold to a jobber, or, if there was no jobber in the territory, then to a retailer who would maintain prices. Mr. Grove to-day is in line.

That much has been accomplished. I believe to-day that 90 per cent. of the proprietors are loyal to us, and fully 50 or 60 per cent. are in our power. We are a giant, and have not realized our power. We have let them advance prices and do as they pleased with us, and have done nothing to restrain them. We now ask the endorsement of the American Pharmaceutical Association, not that we demand anything that is not right;

we demand only justice; we want what belongs to us, and we want nothing more, and *that* we are going to have! (Applause.)

Look what we did with the Cuticura people. When the question came up in Louisville we simply said: "We do not want to sell these goods at all." One hundred and forty-eight of us in that city said we would throw them out. When I went to the Kentucky Pharmaceutical Association I drew up a resolution that hereafter no jobber who does business in the State of Kentucky shall sell Cuticura in the State of Kentucky. That took in Cincinnati, Cairo, Evansville—as far as Cleveland, even —Memphis, Nashville, Knoxville, all around. What is the result? To-day not a dollar's worth of these goods is sold in the State, unless surreptitiously. That shows what can be done. We cannot sit down and let these people advance their prices to what they please. We have got to fight them—give it to them good—good and strong! (Applause.) The National Association of Retail Druggists is willing to lead or to follow. We will follow Mr. Holliday, or follow Mr. Dohme; it does not make any difference which. But what belongs to us we are going to have, by the eternal gods! (Great applause.) What have you done, you people? Get in the fight. Put your heart and soul in it, like I have done. Put your money, your time in it. I have been to Chicago, and St. Louis, and to this meeting, for nothing in the world but the interests of the National Association. Of course, it is pleasant for me to come and meet old friends, but I come solely in the interest of the National Association—and I tell you, gentlemen, the handwriting is on the wall; the retail druggist of the United States is going to have what belongs to him, or he will not sell the stuff. (Applause.)

MR. HYNSON: You are particularly fortunate in your local organization. You have 40 out of 50, I believe?

MR. JONES: We have 148 out of 150.

MR. HOLLIDAY: I live in a town of 40,000 inhabitants, with 34 retail drug stores. We get full price for everything we sell. We always have. But while I was in Chicago in February, in company with Mr. Jones and others in making up a list of jobbers, I got word that a department store in Topeka was putting in a stock of patent medicines, and we tried to prevent it, but did not succeed in doing so. In place of waiting to see what they were going to do—whether they were going to cut the price—we picked out one small store four doors from the department store and had it sell for less than the department store, and the other 33 druggists got full prices. We can see no diminution in our patent medicine trade. Cut the prices below the prices of the cutter. There is no money in it for him then. Is not that a point in favor of local organization? It shows that where a number pull together they accomplish what they go after.

The same thing applies to the National Association of Retail Druggists. We must have confidence in each other. We must believe the people in charge are honest. We hope at Cincinnati to have all the interests in the retail drug trade come there, and then decide what we will do.

Does any one in this room know of an instance where the J. C. Ayer Company, C. I. Hood Company, Green's Nervura, Pabst Malt Extracts, or six or seven or eight more of the leading proprietary medicine manufacturers of the United States, have sold the cutter since the first day of last June? I don't know of a single one. I have omitted one house which agreed not to and has done it.

We are finding that where proprietors and wholesalers, and even retailers, who have been inclined to regard this movement lightly, have found out how much is in the way of being accomplished, that they are all willing to join us and go with us, and try to make the National Association a success. A great deal more has been done. The journals have published almost all the reports of the meeting itself and of prominent conference meetings between the associations. With the means we have had, with the

time each of us could afford to give, I think I may say that we have done a great deal. If a man on the outside does not think so, I would like to have him come in and do a little of it himself.

MR. DEWOODY: Mr. Chairman, the National Association of Retail Druggists seems to have occupied the time devoted to the Commercial Section, and possibly properly so. But I want to ask one question of Mr. Jones and Mr. Holliday. My sympathies are entirely with the Association and its objects, I want to say. After your St. Louis meeting and organization, we received circulars from various proprietors stating that, at the request and by agreement with the executive officers of the National Association of Retail Druggists, they had agreed they would be satisfied with a 50 per cent. profit on patents, and a lot of them proceeded at once to raise their prices. I fail to see the benefit right there. It rather cooled me off on the proposition. Another idea about your Association, which you come here to have endorsed: The gem of the jobber is the retail druggist, and the highest ambition of the young man entering the life of a druggist with all its drudgery, and requiring so much skill, persistency and patience, is to work up and build up his business, and maybe become a jobber in time. Now, do you propose to put a limit on the ambition of the young druggist, and say that the manufacturers and jobbers shall not sell him because he has a retail store—although he may have a jobbing business as well—because he may possibly get an advantage over the ordinary retailer? You may want these advantages after a while yourself, or possibly you may want them for your boys after they grow up. Before you ask the endorsement of the American Pharmaceutical Association, I would like to know a little more about what you are going to do along this line.

MR. JONES: I was at the meeting of the joint committees when that list was made up. We took in everybody that could handle any kind of goods, both wholesaler and retailer, in the cities like Cincinnati, Chicago, Toledo, Cleveland—even Baltimore, where everybody is a wholesaler and a retailer, I believe. (Laughter.) I believe in Pine Bluff we gave Mr. Dewoody his full privilege. There has been no effort to discriminate against any one who felt an interest in our Association. We put on a man in Clarksville who sold wall-paper and school-books, with drugs as a side issue, and a firm in Georgia that sold nothing but factory supplies. We did everything in the world that was fair and square, and, in fact, a little too much. I myself could not get on the list, because I am a retailer. I don't want it; the margin of profit is too small. We have done more than is absolutely right in this matter, and I believe that joint committee hewed to the line as fair and square as possible. The only trouble was, we didn't take out quite enough. As far as the charge is concerned that we have not done the fair thing by the retailer, that is a mistake. Mr. Dewoody is on the list, I am satisfied.

MR. GOOD: Notwithstanding the immense amount of literature that has been distributed in regard to the National Association of Retail Druggists, there are a great many people who know nothing about it after all, and Mr. Dewoody, I am sorry to say, appears to be one of them. It is the details of the work that I hope Mr. Holliday and Mr. Jones will bring out. They have shown what they have done, but not how they did it. That is what I want them to show.

The Wholesale Druggists were glad to accede to the conditions between the National Association of Retail Druggists and the Proprietary Association—with the members individually; they could not be appealed to as an organization, because they were not so constituted—that they should not sell goods at all to retail druggists, especially where there was any effort being made to control the cut-rate business; that the wholesale druggists should be their distributors absolutely. And so all the business was put into the hands of the wholesale druggists, and they were not to sell to department stores or

aggressive cutters. With these conditions it would seem as if it was an easy matter to control the trade, if everybody were honest.

If Mr. Dewoody will agree to the rules of the National Association, as the majority of the proprietors have and the wholesalers have, he will have no difficulty in getting his goods, I am sure.

But how, it will be asked, will it be known who these approved men are? The National Wholesale Druggists and the National Association of Retail Druggists have distributed confidential lists—that is, they have gone to officers of the associations and to those who were entitled to have them—manufacturers of proprietary articles. There was no "black-list." There was an approved list. Mr. Dewoody's name must be on that approved list.

It seems to me it is a very easy matter to show how these goods are to be controlled. As a matter of detail in the workings of the Louisville Association, I was very much interested to have a solicitor of some house—I don't know exactly what house it was now —come to me and show me a certificate which he had brought from Louisville. That certificate set forth the fact that the house which he represented would not sell to department stores and aggressive cutters. That, perhaps, was signed by Mr. Jones. Now, their organization is so complete, that when a solicitor comes in and opens up his goods, the first thing they ask him is, "Where is your certificate?" These are a few of the details.

MR. HOLLIDAY: As to a raise of prices after the organization of the National Association of Retail Druggists, referred to by Mr. Dewoody, I think he is mistaken. I think these advances occurred before that time, about the first of July, August or September; and I think it would be difficult to name a single manufacturer who advanced his prices after the St. Louis meeting, and quite a number reduced them.

It may be of some interest to all of you to say, that the resolution passed by the joint committee at St. Louis, to the effect that certain proprietary articles should not be sold for more than two, four and eight dollars a dozen, was practically a failure, the proprietors considering it so at the time. It was not binding, because they are not an association, but an aggregation of individuals only.

I went to New York and Boston in December with some other gentlemen, in connection with this matter, and we found it was impossible to talk to these people along these lines. They claimed that it cost them so much more—first, the additional tax on everything; then the competition among themselves which has grown so strong; the lack of good-will, and the co-operation of the retail druggists. All I ever got in my life was by mutual concession, giving something and getting something; and we agreed to drop that feature of the work and insisted that the goods should not be sold to cutters, even if it resulted in an increase of price.

MR. DEWOODY: Not in a spirit of argument, because I do not feel any antagonism to the National Association of Retail Druggists. It does not occur to me now what particular items were raised in price; but numerous circulars came to me giving notice that, by agreement with the National Association of Retail Druggists, they had made that price of $2.00, $4.00 and $8.00 per dozen.

MR. HYNSON: I feel in justice to this Section that, as there is a regular order of business—while this discussion has been interesting to the druggists—I must, as chairman, carry on the work of the Section. We have discussed in an informal way this matter, and I will call the regular order of business now.

The reading of the Chairman's address cannot be had, because it is not before us.

Are there any reports of committees to this Section?

MR. MAIN: I presume if there are any that they are in the hands of the chairman of the Section, and he is not here.

MR. HYNSON: Reading of papers, then. Are there any papers to be read? I suppose they are in the hands of the chairman also.

New business. Is there any new business?

MR. ALPERS: Mr. Chairman, if you will permit me, I want to say that I hoped to get some information from the talk here this afternoon. Some of the points are not clear to me. I have not read all the literature published on the subject. I have been conducting a pharmacy where we do not sell patent medicines at all, and perhaps that accounts for the fact that I have not been so much interested about the details of this plan as I might otherwise have been. I am particularly interested now in gathering information, as I am president of one of the few associations in New Jersey that have not yet joined the National Association of Retail Druggists.

Now as to one point that Mr. Jones makes. He says it is fair that the manufacturer shall not sell to the retailer, and I want to know why it is not fair, if, by his energy and sticking to his business, he manages to increase his business to such an extent as to justify it. Why can he not buy in large quantities, as other people do? I believe the men who advocate this rule violate it daily. Do you not buy by the gross because you know you can buy cheaper? That is not fair. When you buy a thousand cigars you ask for a special discount as compared with the price of a hundred. According to your notion, that is unfair, because you are a retailer. This is not clear to me, why the retailers shall not get that discount. I know of wholesalers on the jobbing list in New Jersey who do not sell one-third what some retailers sell. They get a discount, but the retailers cannot get it. A man who has energy should reap the benefit of that energy. A man who is willing to invest his capital should reap the benefit of that capital, whether a retailer or a wholesaler. This is the common usage of the world, and I do not see why the retail druggist should be excluded from this benefit.

MR. HYNSON: The National Association of Retail Druggists is not finally and utterly committed to any one plan. It is perfectly possible for Mr. Alpers to come to Cincinnati as the representative of his local association and present his views, and if he can convince us that his plan is better than ours, I am sure we will be ready to accept his proposition. We have a plan for one year. That plan has been tried and tested. If it is proven that another plan is better, we want to hear about it.

Now, this Section has either got to adjourn to meet again, or it has got to elect its officers for another year. It is with you, gentlemen, as to which it shall be.

Mr. Sheppard, seconded by Mr. Alpers, moved to proceed to the election of officers of the Section, and it was so ordered.

Nominations were called for the office of Chairman of the Section, and Mr. Ebert nominated Mr. J. M. Good and Mr. Main nominated Mr. Charles A. Rapelye for this office.

Mr. Eliel and Dr. Stewart were appointed tellers to take the ballot for Chairman.

MR. SCHELLENTRAGER: While we are balloting, I want to present a matter to the Section. I want to ask a hearty endorsement of the National Association of Retail Druggists at the hands of this Section of the American Pharmaceutical Association.

Mr. Ebert seconded the motion, and it was carried.

Mr. Hynson announced as the result of the ballot that Mr. Good had received 27 votes and Mr. Rapelye 11, and declared Mr. Good duly elected Chairman of the Section. The announcement was applauded.

Mr. Thompson moved that the temporary Chairman of the Section cast an affirmative ballot electing Mr. Rapelye to the office of Secretary of this Section. The motion was seconded by Mr. Hallberg and carried. The Chair announced that the vote had been so cast. (Applause.)

Mr. Hynson: The installment of officers is next in order, and I take pleasure in appointing Messrs. Ebert and Thompson to escort the new Chairman to the chair.

The gentlemen appointed duly performed the office assigned them, and Mr. Hynson said:

Gentlemen: I take great pleasure in introducing to you your new Chairman. I do so because I think that Dr. Good represents the best of commercial pharmacy. I am sure he will introduce into this Section commercial ethics, which I think is more important than proprietary medicines.

Mr. Good thanked the chair for the honor conferred, and took the chair.

The Chair: The By-Laws require that three additional members of the Committee on Commercial Interests shall be named.

Dr. Whelpley nominated Mr. F. W. E. Stedem, of Philadelphia. Mr. Thompson nominated Mr. M. B. Wood, of Rhode Island. The name of Mr. Paul G. Schuh, of Cairo, Ill., was also put in nomination. Upon motion, the Secretary of the Section was directed to cast an affirmative ballot electing the gentlemen named to complete the Committee on Commercial Interests. The Secretary announced that he had done so.

Mr. Main: There was some question as to whether this Section would require the time allotted for another session. That would depend on whether the papers expected from the retiring Chairman, Mr. Jacobs, arrive. I move, therefore, that in the absence of definite information on the subject, when we adjourn it be to meet at the call of the Chairman.

The motion was put and carried.

On motion of Mr. Alpers, the reading of the minutes of this session was dispensed with.

On motion of Mr. Main, the Section then adjourned.

Note.—On September 6th, the day after adjournment of the Section of Commercial Interests, the following letter came to hand, addressed to the Secretary of the Section, in care of the General Secretary of the Association. In the absence ot Mr. Bobbitt, the letter was opened on the assumption that it might be an official communication to the Section, as it proved to be, and it is here inserted for the benefit of all concerned. —*The General Secretary.*

Atlanta, Ga., 9-4-99.

Mr. J. Hal. Bobbitt, *Secretary*,
C/o Chas. Caspari, Jr., *Put-in-Bay, Ohio:*

My Dear Sir: I regret that I will be unable to attend the meeting, but enclose a short

address, which you will be kind enough to read to the members. By doing so you will greatly oblige. Yours very truly, JOS. JACOBS.

CHAIRMAN'S ADDRESS.

Gentlemen: At the last meeting held by this Section, a committee was authorized to prepare resolutions in reference to the then existing movement to form a National Retail Druggists' Association. The resolutions were submitted and were adopted by our Section: they declined any active part in the formation of that Association, but pledged the sympathy of our American Pharmaceutical Association with the "success of every organized effort of retail druggists which will promote their commercial and pecuniary interests." Copies of the resolution were ordered forwarded to the Retail Druggists' Association of Chicago, and the National Association of Retail Druggists, when organized.

As it has seemed for several years that the members of our Association at large have been divided in their views in reference to the causes which have produced the evils complained of as afflicting the retail druggists, and there has been much diversity of opinions as to the proper remedies to apply; your chairman, seeing that our whole Association had committed itself to a sympathy with this movement, has felt that he should refrain from doing aught that might seem to conflict with their plans, and hence he has taken no steps during the year that could conflict with the actions of that body.

It was thought advisable by the chairman not to move in the matter of making exhibits here, as that might tend to interfere with the work of the body with which so many of our members sympathize.

I regret very much to report that no papers have been presented to the chairman of the "Section on Commercial Interests," and that I will be unable to be with you to read this paper in person.

Yours very truly, JOS. JACOBS.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—TUESDAY EVENING, SEPMEMBER 5, 1899.

The first session of the Scientific Section was called to order by Chairman Rusby at 8:30 oclock P. M.

The Chairman said:

It becomes my painful duty to inform you, gentlemen, that Mr. Arny, our Secretary, is very ill in a hospital in Cleveland, and, under the circumstances, I have asked Mr. Mayo, of New York, to act in his place.

I also wish to anounce that the third member of the Committee on Scientific Papers, Prof. Scoville, of Boston, is likewise unable to be with us, and that the Council has appointed Prof. Oldberg to act in his place.

The first thing in order is the reading of the Chairman's Address, and I will ask my friend Mr. Holzhauer to take the chair while that is done.

Mr. Holzhauer took the chair, and Dr. Rusby read his address as follows:

CHAIRMAN'S ADDRESS.

It has seemed to your Chairman that nothing could be more desirable upon the present occasion than to discuss the relations of our Association to the higher grade of scientific work. It is not designed to offer any specific recommendations for legislation by the Section, but to present an earnest plea for the cultivation of the scientific spirit among the body of our members, by such general or indirect influence as we may be able to exert.

To say that this spirit has been markedly wanting in the past would be scarcely in keeping with the facts, but it is not too much to say that it has not been so general among our members as the interests of the Association demand. There is a strong tendency in all pharmaceutical work to restrict the attention too closely to immediate practical results, failing to enter into the genuine spirit of investigation which should characterize all scientific work, even along applied lines. We see this restrictive tendency most strongly manifested among those who come as students to our educational institutions, a sure indication that it exists among those from whom they draw their inspiration, and the same spirit has not been wanting at the meetings of the Association.

There has been, it is true, a steadily increasing number of our members who have manifested a disposition to take a higher view of their responsibilities and to present contributions in which scientific ideals were prominent, but the reception of such work has sometimes been not altogether satisfactory. Frequently have we heard those among

us who have contributed such papers criticised as desiring to establish a small mutual admiration society, and as working from a desire to thrust themselves into inappropriate, if not undeserved, prominence. It has been more than once remarked, and some such statement has even appeared in print, that the college professors among us especially desire to place themselves upon exhibition. These remarks—they do not reach the dignity of criticisms—are commonly ill-tempered and born of sentiments which will not bear investigation. In themselves, therefore, they would not be worthy of our attention and one should apologize for introducing them in this place were it not for the fact that they are but the exaggerated expression of a sentiment sufficiently common among our members to have become to some extent representative, or at least apparently so, of the Association. Expressing this sentiment more accurately than is done by the opinions quoted above, has been the seriously expressed inquiry whether this Section of the Association were not tending toward theoretical and impractical activity and neglecting the more serious and useful questions pertaining to every-day pharmaceutical interests. A common expression of this inquiry has been, "Are we not flying above the heads of the retail pharmacists?" A more elegant and probably upon the whole very accurate way of stating the idea involved would be, "Are we not substituting the discussion of pure science for that of applied pharmaceutical science?" It is this tendency, observed now for some years at our meetings, which has suggested to the Chairman a discussion of the relations of this Section toward the two classes of scientific work denominated respectively "pure" and "applied."

We have to judge of these relations primarily in view of our constitutional objects and aims, but the language of our constitution must be interpreted in the light of our relations toward the modern Pharmacopœia, and even more so in that of the remarkable change that has taken place in the relations of general science to practical pharmacy.

A perusal of the seven paragraphs of Article I. of our Constitution, where the objects of the Association are enumerated, indicates clearly an intent on the part of its framers to direct our work strongly toward practical pharmacy, and by thus concentrating our efforts to strengthen our influence. Yet paragraph III of this article opens wide the door to a liberal interpretation as to the manner in which this desired end is to be attained: it says, "To improve the science and art of Pharmacy by diffusing scientific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent and stimulating discovery." What science is it that we are to improve, what scientific knowledge to diffuse, what talent to develop and what discoveries to stimulate? Are they limited to the immediate processes of pill-making, of tincture and tablet manufacture, or even to the higher art of safe and accurate prescription filling?

Even if such an idea had been in the minds of the framers of our constitution, the revolution which has since occurred in pharmaceutical science would render it no longer tenable. It has always, and naturally, been the function of the American Pharmaceutical Association to act as the interpreter and supporter of the U. S. Pharmacopœia, a function which would require us to keep pace with its scientific advances; but of late there has been added the distinct duty of aiding in the preparation of this work and of investigating in advance the facts and principles upon which its dicta are to be based. These duties we cannot perform in any narrow spirit of restricted activity. The Pharmacopœia is itself being steadily forced by the progressive trend of modern pharmacy into fields unrecognized by it a decade or two since. If we attempt to limit ourselves to what it requires of us to-day, we shall find ourselves totally unprepared for its demands of to-morrow.

What a change has occurred in the relations of practical pharmacy to general science since these paragraphs were written in our constitution! Many of the simple chemical substances then in general use, have been in great part replaced by synthetics of complex composition and of an almost infinite variety of reaction. Those still in favor

must now, to satisfy our requirements, reach a degree of purity unthought of when the authority of their labels was all that was required to satisfy American Pharmacy. Even the more elegant forms in which they are now dispensed call for a greatly extended knowledge, and the pharmacist who possesses this knowledge in highest degree, profits directly in his business thereby, thus placing a premium upon knowledge in advance of the Pharmacopœial requirements. The former necessity for the purchase of vegetable drugs in an entire condition, is disappearing in the face of the gradually accumulating evidence that we can in most cases determine the character of the finest powder by the aid of the microscope and by the teachings of modern plant histology. The quantitative determination of the active constituents of plants was a new and generally unwelcome subject even so recently as when our present edition of the Pharmacopœia was under consideration, yet the character of the papers presented to you this very day will show that it has become the most popular subject of pharmaceutical investigation. No sooner are we fairly entered upon this line of investigation than we realize how completely our medical confreres have left us in ignorance as to what are the active principles of our drugs, and we accept the necessary duty of taking up this department of pharmacology as an additional branch of pharmaceutical research. From this investigation in turn we learn that there are many drugs which do not admit of chemical assay, and are thus directed to physiological tests as the only means for estimating them, and as an alternative to employing them blindly. To all these demands for a broadened view of the scientific mission of the Assooiation, we must add those arising from the numerous modern applications of electricity to therapeutics, of the great array of orthopedical applications, of the growing importance of nutrients in the pharmacy, and we must appreciate that the conditions have so materially changed that the same class of work which could in the past satisfy the requirements of this Section is no longer sufficient or even appropriate .

Does it not seem strange, almost shameful, in the light of these considerations, that the true friends of the profession should be called upon to refute the almost vulgarly frequent claim that pharmacy is in its decadence? Is it not time that we cease to talk upon the defensive, and begin to act courageously and freely upon the assumption that pharmacy is entering upon an era more brilliant than any in its past history, an era dominated by the highest scientific ideals, and one which shall reward the pioneers who have so long been obliged to face opposition and doubt, and the far more effective inertia, of the rank and file among pharmacists.

We need not be reminded that a great body of practicing pharmacists will be slow to recognize the reality of the new era, and that many of them will never do so. History would not be true to its precedents without such an incident in the progress of any movement. All thinking persons have come to recognize two contending elements in pharmacy, the one professionally progressive, the other temporizing, timid and selfish, according to the best definition of selfishness as the "preference for an immediate lesser good rather than a remote greater one;" and most persons appreciate equally well that the latter class must eventually go to the wall.

This class of members could never be considered as representative of the profession, even though they were in a majority of twenty-fold. Two quite distinct elements are to be found in every association and enterprise, each in a way representative. The one represents what it is to-day, the other represents its tendency, progressive or retrogressive; because societies, like individuals, never stand still; they must advance or they will certainly recede. The one element thus becomes representative of a condition or state, the other of the nature of the body. The latter class must be regarded as truly, the former as falsely representative.

It was to satisfy some such spirit as this that we last year took action in two specific cases to provide for such topics as might be denominated minor in a scientific sense, but

of supposed great interest from a practical standpoint. But the mountain has labored and brought forth a mouse. A single query, very commonplace, has been received by the committee appointed to handle this expectedly great volume of correspondence, while the section on the interests of retail pharmacists has received little better encouragement. We may well paraphrase the old adage by reminding ourselves that the lower we aim the lower we will strike, and the more certain we will ever be to miss even the small success for which we strive. The universal experience of human progress teaches that people who clamor for something easy are in reality after something still easier than that for which they clamor, and that those who are after the something easier are at heart complete do-nothings. It is these same people who would deny Pharmacy a position among the learned professions, by holding open a sort of a back-door for a surreptitious entrance to her halls without paying the price of a professional preparation.

If then it is true that it is the highest and best which most truly represents American Pharmacy, surely it is in the Scientific Section of the American Pharmaceutical Association, its most characteristic representative, that we should look for the best that American Pharmacy can produce and for the highest ideals of which it can conceive. Here at least no expression should ever be found acceptable which implies that any scientific aspiration is out of place.

As civilization has progressed and as education and social conditions have advanced, the recognition of science, even when considered abstractly, as an indication of such progress, has become more complete and open, and its achievements have come to be regarded as the highest ornament of any institution from which they proceed. Viewing the world over, we cannot escape the conviction that a high scientific character, mental and moral, as well as physical science being taken into consideration, is the pride and the goal of all great and influential bodies. Viewed from this standpoint alone, and in the absence of any immediate practical bearing which it might have upon pharmacy, the Association would be fully justified in encouraging the presentation at each meeting of important scientific discovery as the best fruits which it could offer to the world. Yet it is not upon such sentimental grounds that this argument is based, but rather upon the principle that such a course is in the end to the best interests of practical pharmacy. The attempt is here made to indicate that our Association has reached a time when it may be said that there is no such thing as "pure science," in the sense of science divorced from direct connection with practical matters, but merely a science from which all elements of chance, of legendary authority, of slavery to custom and dodging of the necessary processes of investigation have been eliminated. There is no such thing in our day as impractical theory; nothing which is good in theory but bad in practice. This is the cry of either ignorance or duplicity. Good theory in these days is always good to practice, and, if the practice be equally good, is always good in practice. The most thoroughly scientific methods are therefore urged as the surest and on the whole the most rapid means of attaining to practical ends.

In view of the considerations here presented, it is the opinion of your Chairman that the chief need of this Section is to improve the quality of its work in the direction of liberal researches in the sciences allied to pharmacy, rather than to specially attend to minor practical details, and that such a course will stimulate rather than discourage activity in the latter direction. It is believed that the best way to accomplish this purpose is by the individual activity and influence of our members in stimulating interest in such subjects, rather than by any official action by this Section. Yet it is deemed wise to print the conditions for competing for the several prizes each year upon the circular of the Scientific Section, these prizes being regarded as the most efficient official influence that we have, looking in this direction. It is furthermore believed that the fifteen-minute rule now in force is very detrimental to the best work of the Association; that the discussion through an entire half day, or more if necessary, of one really great paper

would be of greater advantage than the presentation of a larger number of minor ones, and that at least one paper each year should thus have allowed it all the time it requires.

There are two ways in which this result could be accomplished. Papers might be accorded first places successive in the order of their quality, the lesser ones taking their chances of being read by title; or two sessions might be held at the same time, as is done in other national associations, the members selecting that session which they prefer to attend.

This view is based upon the belief that the highest and most greatly prized honor that this Association could bestow upon one of its contributors would be to award first place at our annual meeting to his contribution.

Hearty applause followed the reading of the paper.

THE CHAIR: Gentlemen, you have heard the reading of the Chairman's Address. What is your pleasure?

It was moved by Dr. Bartley and seconded by Dr. Reed, that a committee of three be appointed to whom the Chairman's Address should be referred for consideration, and report at a later session. Carried.

The Chair appointed as such committee Messrs. Ryan, Beal and Whelpley.

Dr. Rusby resumed the chair.

THE CHAIR: The next thing in order is the report of the Committee on Queries by Retail Pharmacists. This was to have been presented by Mr. Scoville, chairman of that committee, and he says that but one query reached him, and that of a trifling nature, which he answered. And this in spite of the fact that the matter was widely published.

The next order of business is the nomination of officers for the ensuing year. You will now make your nominations for Chairman and Secretary, which will be posted in the hall to-day, and to-morrow, before a vote is taken, additional nominations may be made.

Mr. Alpers nominated Mr. F. G. Ryan, of Philadelphia, for Chairman.
Mr. Main nominated Mr. C. A. Mayo, of New York, for Secretary.

THE CHAIR: If there are no other nominations for Chairman and Secretary, the nominations will be closed until to-morrow morning.

The Third Member of the Committee on Scientific Papers is chosen by the Chairman and Secretary-elect.

The next business in order is the report of the Committee on the Ebert Prize, Dr. Whelpley chairman.

MR. CASPARI: That report was read and approved at the general session of the Association this morning. Such has been the custom in past years.

THE CHAIR: That appears to be an irregular proceeding.

MR. CASPARI: It may seem a little irregular, but it has been the custom for years for the Chairman of this Section to appoint the Committee and the report to be read at the general session. However, we could get away from that custom, if desired.

DR. WHELPLEY: As Chairman of that Committee, I would report to the Section that the Committee, after carefully considering the papers presented at the last meeting, de-

cided that Prof. Henry Kraemer's paper on the "Quantitative Estimation of Powdered Crude Drugs" was entitled to the prize. The question was, first, whether any of the papers came within the conditions surrounding the prize, and, second, whether any were worthy of the prize; and of the papers presented, that of Prof. Kraemer was selected unanimously by the committee for the prize.

THE CHAIR: What is the pleasure of the Section in regard to this report, which has been read where it did not belong?

Dr. Reed moved that it be received, and it was so ordered.

The Chair announced that the next order of business was the reading of the report of the Committee on Revision of the Pharmacopæia, Mr. Eliel chairman.

MR. FENNEL: As I understand, there may be some action taken by this Section on the recommendations of the Committee. I want to know if that action is final. Is the action taken by the Section in adopting the recommendations of this Committee binding on the Association at large? Must the Section's action go to the Association for final adoption, or does it end here?

MR. CASPARI: It ends here. The report was up for discussion at the general session this morning, and referred to this Section, which action, I should say, binds the Association to any disposition this Section may make of the Report.

Mr. Eliel thereupon read the report of the Committee, as follows:

REPORT OF COMMITTEE ON REVISION OF U. S. PHARMACOPŒIA.

To the Officers and Members of the American Pharmaceutical Association: Your Committee on the Revision of the U. S. Pharmacopœia respectfully submit the following:

Cold Cream. The present formula for making cold cream is objectionable because of the presence of a small amount of borax. When ordered in prescription as a base for mercurials in ointments, the result is that the mercurials are always decomposed. Experiments as well as actual experience have demonstrated this. An ointment made with calomel and cold cream will almost immediately change to a black color, due to a reduction of the mild chloride to the metallic state or black oxide. This is true also of the ammoniated mercury, yellow iodide and yellow oxide. This latter is often in some localities ordered as an inunction for the eye. Changes are likewise caused in mixtures of cold cream and resorcin. A return to the formula of 1870 or 1880 is suggested, or an introduction of an ointment of equal contents minus the borax and rosewater, is suggested.

Medicated Waters. The present directions for making the medicated or aromatic waters are objectionable and should be condemned. We would suggest the methods submitted in the 1895 report.

Camphor Water can be made by fastening suitable pieces of camphor to a glass rod and sinking same in water in a suitable container. The water will be saturated in a few days, when a portion may be withdrawn for the shop bottle, and the other container refilled. In this way a continuous supply is available.

Tincture of Myrrh is now made by maceration. It can be made more expeditiously and of greater uniformity by percolation.

Tincture of Guaiac, Ammoniated, is now made by maceration. Can be prepared in a few minutes by trituration of the drug with prescribed menstruum in a porcelain mortar.

Tincture of Iodine, now made by maceration, can be quickly made by suspending the iodine at top of menstruum, held in place by being confined in a perforated glass tube, or placing in a funnel prepared with a cotton plug as in percolation.

Solid Extracts can be prepared of a more uniform quality and at less expense by use of acetic acid.

Powdered Extracts. The introduction of a line of powdered extracts is desirable.

Cerate of Cantharides. Longer maceration in the hot cerate is desirable.

Compound Resin Cerate. The reintroduction of Deshler's Salve and an improved formula for same, of yellow wax, turpentine, resin and petrolatum appear desirable.

Tincture of Deodorized Opium. Petroleum ether may be advantageously used in place of ethyl ether for washing the aqueous solution.

Oleoresins. We recommend the use of petroleum ether instead of ethyl ether in their manufacture.

Acid, Boric. It is more often obtained in a fine powder than in crystals. The description should include this

Acid, Hydrocyanic. The addition of glycerin aids very much in preserving. Such an addition seems desirable.

Acid, Lactic. A mixture of free lactic acid and lactide, the latter having the property of forming more acid by combining with water when diluted. The commercial acid frequently has a neutralizing power equivalent to an 85 or 90 per cent. acid. The description and tests should be changed to correspond.

Acid, Sulphurous. It is difficult to make this with the quantity of sulphuric acid and charcoal allowed. An excess of both of these agents is necessary for convenient work. Since the added expense would be immaterial, a large excess of these should be directed.

Adeps. This should be rendered by the pharmacist from leaf lard. A process should be included.

Adeps Benzoinatus. This should be made during the operation of rendering lard, to avoid a second heating as a matter of convenience. (It might be well to drop the plain lard altogether.) An alcoholic or oleaginous solution of benzoin is much more satisfactory than the use of the resin in benzoinating.

Alcohol Deodoratum. A process of preparing this with potassium permanganate is desirable. Alcohol so treated should be directed in preparations containing alkalies, as spirit and aromatic spirit of ammonia.

Aluminum Sulphate. The commercial article is seldom, if ever, entirely soluble in water. "Nearly soluble" would better describe it.

Aqua Creosoti. This should be prepared extemporaneously. The time involved does not prohibit this, and in no other way can a uniform product be dispensed.

Asafœtida. The use of powdered gum-resin for official and medicinal preparations should be prohibited in a special paragraph.

Myrrha. The use of powdered gum-resin for official and medicinal preparations should be prohibited in a special paragraph.

Barium Dioxide. Tests should be included for the nitrate and the chloride. The presence of these as impurities, in any material proportion, prevents the preparation of hydrogen peroxide solution from it which will be within the required limits of acidity.

Bismuth Subcarbonate and Bismuth Subnitrate. The medicinal value of these compounds depends quite as much upon the lightness and fineness of the powder as upon chemical purity. Commercial samples vary much in the first regard. Some standard of fineness and a method of regulating or comparing the same is desirable. The same is true of calcium, lead and zinc carbonates and of zinc oxide.

Calcium Carbonate, Precipitated. This varies considerably in the fineness of its powder as obtained in the market. The lightest samples are quite twice as bulky as the fine.

A method of comparing and a standard of fineness are very desirable. The prepared chalk is much more uniform in this regard.

Cinchona Assay. There is no need of separating the alkaloids especially for the estimation of quinine. After weighing the total alkaloids from the first operation they may be redissolved in a little chloroform, the chloroformic solution mixed with sand or broken glass and then dried at a low temperature, after which the powder is treated with ether as directed. The average pharmacist will get better results if two portions of percolate of 20 Cc. each, instead of 10 Cc. each, be secured. This has been demonstrated repeatedly.

Emplastrum Plumbi. The official process is out of the question for the average pharmacist, the time involved being too great. Plaster prepared by double decomposition is widely and satisfactorily used, and the process appeals much more to the retail apothecary. The introduction of such a process with a description of the plaster and a limit of moisture allowable is desired.

Extractum Nucis Vomicæ. If the percolate as obtained from the drug be chilled for an hour in a mixture of ice and salt, the fat will be separated from the liquid and can be eliminated by filtration while cold. The use of ether is then unnecessary. The product so obtained is lighter in color and remains in a pulverulent condition better. This is the result of a large number of trials.

Ferri et Quininæ Citras and Ferri et Quininæ Citras Solubilis. The use of quinine dried at 100° C., as directed in the Pharmacopœia, is tedious and inconvenient. Quinine so dried dissolves very slowly. Some of the commercial samples are made with quinine sulphate, and so far as appearances and strength in quinine are concerned these are quite satisfactory. The sulphate is always at hand, costs less than half as much as the free alkaloid, dissolves readily, and the salt scales well. The presence of this small amount of sulphate in the salt cannot be considered very objectionable. The substitution of quinine sulphate for quinine would encourage the pharmacists to make these salts, and would satisfy most of the conditions now existing.

Ferri et Strychninæ Citras. This were better prepared extemporaneously and in solution.

Liquor Ammonii Acetatis. The method of the 1880 Pharmacopœia of preparing this by mixing two solutions, kept in stock, is more convenient than the present method, and is still adhered to by many pharmacists. We recommend a return to this method.

Liquor Calcis. Prepare with water instead of distilled water.

Liquor Zinci Chloridi. If much iron is present the mass will not fuse at 115° C., or even at many degrees above this temperature. The heat then changes the chloride to oxychloride, which is insoluble, and trouble ensues. It were better to heat not above 115° C. until the nitrous fumes are driven out, and then dilute to strength.

Magnesii Citras Effervescens. The present formula is useless. The method is long and tedious, and unless followed with the utmost care will result in a salt which is alkaline in reaction, owing to loss in drying and powdering the acid citrate formed in the first reaction. This acid citrate is tough, sticks to the plate on which it is dried, powders with difficulty, and a loss of only 2 per cent. of the mixture will spoil the salt. When finished, the salt does not dissolve readily, gives a cloudy solution and is uninviting. It costs several times as much as the more popular effervescing sulphate of magnesia, which has practically displaced it in the market. The present salt is already obsolete and should be dropped, and an effervescing magnesium sulphate should take its place.

Liquor Magnesii Citratis. Here too, an effervescing solution of magnesium sulphate is more popular. It makes a brighter solution, keeps better, and is claimed by some to act better. It seems worthy of consideration, whether a change is not desirable here also.

Oleum Aethereum This preparation can be conveniently estimated by means of barium chloride, and the variability and expense of this body justify the introduction of an assay process.

Opium. In the assay of opium and its preparations, the shaking is not prolonged enough. The present directions are to shake ten minutes and then set aside for 6 hours or one night. By these directions the results, as found in a long series of trials, are about one per cent. low. The morphine should be allowed to crystallize not less than 12 hours, and the mixture should be shaken repeatedly during that time. The aggregate amount of shaking should be not less than one hour, distributed more particularly near the beginning and at the end of the crystallizing period. Morphine will not crystallize unless agitated thoroughly, and the mixture cannot be shaken too much. Repeated trials during a series of years have demonstrated this, the morphine obtained being frequently tested and found to dissolve in lime-water.

Petrolatum Liquidum. The United States Pharmacopœia specific gravity is too high and too wide in range. It is impossible to obtain a fluid petroleum having a sp. gr. of .945. Five different commercial specimens ranged in density from 0.858 to 0.870. The lighter varieties which are decolorized with animal charcoal will rarely exceed 0.875 nor fall below 0.850. There are heavier varieties in the market valued for lubricating purposes which are decolorized by treatment with sulphuric acid, and which may be as dense as 0.900, but these are unlikely to be used for medicinal purposes, though it may not be wise to exclude them. It has been claimed that these denser oils are liable to contain traces of sulphur compounds, which may cause eructations when taken internally or may develop ill-smelling products in some combinations.

The oils are not colorless, but have a decided fluorescence. Otherwise, they may be white to pale lemon-yellow, though exposure to a strong light for some time will develop a decided yellow color, due, it is thought, to the presence of minute quantities of phenol compounds.

When chilled the oil should become decidedly opalescent, but should not separate crystals of paraffin. This would be a desirable test to add.

Pilulæ Phosphori. The mass contains so much gum that it is elastic and very difficult to form into shape. A mixture of powdered licorice or althæa and tragacanth makes a much better mass.

Potassa. It appears to be impossible to obtain this of the desired strength and purity. If the strength reaches as high as 90 per cent., the salt contains large quantities of chlorides or sulphate as impurity, while if free from these impurities the strength is low. A strength not exceeding 85 per cent. would more nearly meet the conditions, and this would not be difficult to obtain.

Pyroxylin. In ten years of trial at the Massachusetts College of Pharmacy, the quick method of making this (digesting for four minutes in the warm acids) has given uniformly satisfactory results. This method is much better adapted for pharmacists and should be adopted. A test for solubility, limited or comparative, would be an advantage.

Saccharum. This is not "permanent in the air," but is decidedly hygroscopic, particularly in a damp atmosphere. This is the cause of variation in some of the official syrups, and the fact should be recognized.

Sapo Mollis. The directions to "add gradually" the alkali solution to the heated oil are hardly explicit enough. This is the critical part of the operation, and should be more emphatic. A direction to add the alkali in three equal portions, boiling after each addition, will insure better results.

Sodii Boras. A statement to the effect that the solution in glycerin is acid in reaction should be incorporated.

Spiritus Aetheris Compositus. A qualitative and quantitative test for ethereal oil should be included.

Spiritus Aetheris Nitrosi. The concentrated ether is best made without distillation. This process is easy and requires little time. The concentrated ether can thus be made official, to be diluted as required, or the fresh ether diluted when made, as at present.

Spiritus Ammoniæ and *Spiritus Ammoniæ Aromaticus*. The alcohol used should be treated with potassium permanganate to avoid discoloration.

Spiritus Glonoini. Dr. Rice's process for the assay of this preparation should be adopted.

Syrupus Acidi Hydriodici. A reduction in the quantity of syrup makes a better product. It also keeps better. Six hundred grams of syrup in a thousand is sufficient.

Syrupus Ferri Iodidi. More sugar will improve the keeping qualities of this product. Three hundred Gm. of sugar additional is an improvement.

Syrupus Hypophosphitum. More sugar improves this also. With 650 Gm. in place of the 500 Gm. directed, the syrup remains clear for a longer time.

Tinctura Strophanthi. The freshly prepared tincture should be chilled to solidify the fat and filtered while cold, whereby a clear and fat-free tincture is obtained.

Unguentum Hydrargyri Nitratis. Few preparations are more variable as found in the market, and the Pharmacopœia sets no standard except in mercury strength A description and tests, if possible, should be inserted.

Your Committee has in several of its previous reports called your attention to the desirablity of standardization of drugs and their preparations. Because a drug has not yet received sufficient investigation to establish its active principle or principles sufficiently for general accceptance is no reason why it should not be taken up by the Committee and standardized.

The Committee will consist of medical as well as pharmaceutical men, and for unknown drugs the pharmaceutical men should furnish the constituents of the drugs, and the medical men then test them and determine which is or are their active principle or principles respectively. Unless this Committee takes up this matter earnestly, instead of waiting until others do the investigating, pharmacologically, therapeutically, pharmaceutically and chemically, it will be many years before we will have a truly scientific and accurate Pharmacopœia.

It is the duty of this Committee to either make these investigations or have it done by others. The drugs that should be standardized by establishing a method of assay and adopting a standard of active principle or principles are as follows:

Aconite Root, Aloes, Anise. Asafetida, Aspidium, Aspidosperma, Balsam Peru ana Tolu, Belladonna Leaf and Root. Buchu, Columbo. Cannabis Indica, Capsicum, Coca, Colchicum Root (seed to be dropped), Colocynth, Conium Leaf, (seed to be dropped), Convallaria, Cubeb. Digitalis, Belladonna Plaster, Ergot. Eucalyptus, Frangula, Gelsemium, Pomegranate, Guarana, Hops, Golden Seal, Henbane, Ipecac, Jalap, Matico, Physostigma, Pilocarpus. Wild Cherry, Cascara, Sanguinaria, Stavesacre. Stramonium Leaf (omit seed). Strophanthus, Veratrum Viride, Ginger, Extracts of Aconite, Aloes, Belladonna Leaf, Cannabis Indica, Cinchona, Colchicum Root, Colocynth, Conium, Digitalis, Ergot. Henbane, Jalap, Physostigma, Podophyllum, and Stramonium Seed. Oils of Anise, Cloves, Cassia. Coriander, Eucalyptus, Juniper, Lemon, Lavender, Peppermint. Savin, Sandal and Sassafras.

Oil of Juniper. More definite requirements are necessary, for by those given, an adulterated oil cannot be distinguished from a pure oil, inasmuch as both contain oil of turpentine. The Committee should themselves distil several pure oils from different samples of healthy berries, and then determine what are the normal constituents of a pure natural oil. These should be stated in the U. S. Pharmacopœia, together with a method of determining all proper impurities.

Oil of Eucalyptus. A standard content of Eucalyptol should be established, if it is to remain official. It would be preferable to substitute Eucalyptol for it, since it is so rich in this substance, and as this is unquestionably its active principle.

Oil of Savin. As described in the U. S. P. it is an adulterated oil, as are oils of bay and coriander, for neither the specific gravity, nor the boiling point, nor the solubilities

are those of a pure savin oil. As sabinol has been isolated and studied and is most likely the active principle, a sabinol requirement should be established.

Oil of Sandal. It requires more specific data as to standard of purity. There are so many kinds of sandalwood that yield so many kinds of sandal oil that either a certain variety should be required, or a standard content of santalal and santalol should be established, the latter would be preferable.

Aloes. No source of kind should be made official, but aloes of a certain aloin content should be required under the general head of Purified Aloes.

Asafetida. This should have a standard strength of resin.

Aspidium should have a standard strength of filicic acid and a standard method of assay.

Buchu should have a standard strength of oil.

Capsicum should have a standard strength of oleoresin.

Coca should have a standard strength of ether-soluble alkaloids.

Colchicum Root and Seed should have a standard strength of colchicine. The seed, however, should be dropped, and the root alone remain official.

Conium should have a standard strength of coniine; *Cubeb*, of oleoresin; *Digitalis*, of digitoxin; *Belladonna Leaf* and *Root Plaster*, of mydriatic alkaloids; Eucalyptus, of eucalyptol; *Buckthorn*, of frangulin; *Gelsemium*, of gelsemine; *Pomegranate*, of total alkaloids; *Guarana*, of caffeine; *Hops* of lupulin; *Golden Seal*, of hydrastine; *Henbane*, of total alkaloids; *Jalap*, of convolvuline; *Matico*, of oleoresin; *Ipecac*, of total alkaloids; *Physostigma*, of eserine; *Pilocarpus*, of pilocarpine; *Wild Cherry*, of hydrocyanic acid; *Cascara*, of purshianin; *Sanguinaria*, of sanguinarine; *Stavesacre*, of total alkaloids; *Stramonium Leaves*, of total alkaloids; *Strophanthus*, of strophanthin; *Veratrum Viride*, of cevadine; *Ginger*, of oleoresin; *Cannabis* and *Ergot*, according to Keller their active principles are cannabine and cornutine. These drugs should be studied by the committee, and the active principles isolated and established as such from a number of healthy specimens of both drugs and a standard for each established.

We submit the following reference to the British Pharmacopœia, same being part of the report of the Pharmacopœial Committee of the Illinois Pharmaceutical Association, for your special consideration.

This Pharmacopœia contains 37 classes of pharmaceutical preparations, embracing 433 preparations; the most noteworthy being a class of concentrated liquors for the ready preparation of syrups, etc., by admixture. These are made by extraction of drugs, mostly by watery infusion or decoction, concentration and addition of alcohol for preservation, and in most instances of 50 per cent. drug strength. These preparations seem to represent the idea so long contended for, of a concentrated liquid preparation of drugs that may be made more readily and economically in a small way by the pharmacist than can the fluid extracts.

The class seems to be confined to drugs easily extracted by water, such as senna, glycyrrhiza, sarsaparilla, etc., and these liquors, therefore, mix with syrup without precipitation. Since no alcohol is used, except what may be required for preservation, and this by direct addition, there is no loss of alcohol, as is entailed in percolation and evaporation.

By careful discrimination the list may be extended to nearly all drugs having water-soluble constituents desired in a permanent liquid form for ready miscibility with watery liquors. The effect of prolonged heat consequent upon the evaporation of greater volumes of watery infusions for concentration must also be carefully considered.

The list of ointments comprises 44 preparations, and is, without doubt, the most scientific grouping of external medicaments of any Pharmacopœia extant. A number of different vehicles are directed to be employed, evidently carefully differentiated as to the especial therapeutic purpose and effect of the medicinal agent. Thus, three different paraffins are designed for ointments of antiseptic agents, which are not desired to be absorbed, or from which local effect only is expected, such as the oxides of mercury. Wool-fat is largely used, and for the alkaloids oleic acid and lard, to promote absorption.

Oil of Camphor. White, light, sp. gr. .895–.920, not now official. It should be investigated, as it has been used in liniments with excellent results, and is much cheaper than camphor. Can also be used as a substitute (externally) for oil turpentine. It is less inflammable, the flashing point being 44.5° C., and that of turpentine is 33.7° C. It is a good solvent for resins.

Oil of Camphor, Heavy. A volatile oil, having an oily consistence, pale green color, odor resembling oil of sassafras. Inflames with great difficulty, has a powerful antiseptic and disinfectant action. Boiling point between 240° and 300° C., sp. gr., .970–1.070. Further information regarding camphor oils may be obtained from Schimmel & Co.'s Semi-annual Reports for October, 1890 and 1898, and April, 1897 and 1899,

Copaiba. Test for gurjun (carbon disulphide, nitric and sulphuric acids). If gurjun is present will turn purplish-red or violet. Out of six samples taken from original packages, the following results were obtained:

No. 1. Turned greenish.

No. 2. Turned colorless.

No. 3. Turned muddy brown.

No. 4. Turned reddish.

No. 5. Turned brown, with green cast.

No. 6. Turned dark brown.

A small quantity of gurjun being added to No. 6, it turned purplish red. The United States Pharmacopœia should state the colors or color for the above.

Hydrogen Dioxide Solution. There is much complaint regarding the instability of the official article. A method for the preparation of a stable article is desired.

Inasmuch as this is the last report until after the meeting of the General Committee of Revision, it would be well to review some of the more important suggestions made by your Committee in the past.

Among these were that Spiritus Frumenti and Spiritus Vini Gallici, as well as Vinum Album and Vinum Rubrum be dismissed from the Pharmacopœia. The medicated wines dismissed and replaced by vinegars.

Another suggestion was to dismiss all tinctures having a fluid extract of the same drug official, and all fluid extracts having a tincture of the same drug official; substitute for such tinctures and fluid extracts a 50 per cent. tincture under a distinctive title.

The substitution of granulated Opium for all liquid preparations of Opium, in place of the powdered Opium, changing standards for purity of Linum, Sinapis Alba, Sinapis Nigra, Powdered Acacia and Cambogia to conform with the conditions as found in the markets; changing process for making Tincture of Catechu, Comp'd. The introduction of purified Methyl Spirit for the manufacture of solid extracts, and for preparations for external use. The introduction of a concentrated solution of Hydriodic Acid from which Syrup of Hydriodic Acid can be readily made as wanted. To make Linimentum Saponis from dried Castile soap shavings. To change description of drugs so far as odor is concerned. To change description of Salol as to odor. The establishment of a scientific laboratory to carry on investigations by the Revision Committee. Changing the formula of Sapo Mollis to that proposed in report of 1895. Reinstatement of formula for Tincture of Nux Vomica, of United States Pharmacopœia, 1880, but retaining the required standard of content of alkaloids of present formula. Changing formula for Tincture of Musk. Changing standard of Chlorinated Lime. Introduction of Maximum Doses. Introduction of working formulas of widely-used preparations, such as Syrup Stillingia Compound. Standardization of Essential Oils. Introduction of Codeine Sulphate and Codeine Phosphate. Introduction of Kola and Saw Palmetto.

F. W. E. Stedem,
A. R. L. Dohme,
W. L. Scoville,
Leo Eliel, *Chairman*.

Applause followed the reading of this report.

THE CHAIR: Under the arrangement entered into, it is proposed to omit the discussion of this report until after Mr. Good has read his paper on the Pharmacopœia of 1900.

Mr. Good read his paper as follows:

THE PHARMACOPŒIA OF 1900.

J. M. GOOD.

In revisiug our national standard it is possible for physicians to render valuable assistance. Originally it was their hand-book; for such service we are still able to count upon a few of them. It must be acknowledged, however, that it is for pharmacists that the work possesses the greater interest. With the most progressive of them it is vital and absorbing. This is particularly so as the time for the decennial revision approaches. Innovations or changes we want to consider calmly and judicially. The task should be approached in a spirit of progressive conservatism, paradoxical as this may seem.

Up to the time of issuing the sixth decennial revision, the work was little more than a list of selected drugs and chemicals and a limited number of processes for pharmaceutical preparations. As it was reproduced *verbatim et literatim*, in the dispensaries and text-books on Pharmacy, and was dependent on these for explanation of its processes, not many physicians or pharmacists were sufficiently interested in it to purchase a copy. The convention of 1880 marked a new era in its history. The superiority of the present volume is unreservedly admitted by Europeans. The criticism which is passed upon it most frequently by our own people is that it is too good. That should not disturb us. Let the next volume be better, but let it, like the tariff, be revised by its friends. Descriptions of drugs, and tests for the purity of chemicals must remain.

If in some instances the latter be too exacting, let them be modified. *Medicinal* purity does not in all cases necessitate *chemical* purity.

The legal requirements of adulteration acts in the several states are sufficiently exacting if they insist upon the first condition.

Suggestions for extending the scope of the next volume and improving it are not wanting. There seems to be a strong demand for the insertion of a table of doses. Arguments pro and con are likely to be offered. It should be possible to prepare such a table. While it would be authoritative, it must be understood that a physician may use judgment and discretion in exceeding the given maximum dose of any drug or preparation thereof. By the employment of some sign, mutually understood, he should indicate to the druggist that he is aware that an unusual dose has been ordered. We must not forget, however, that so-called stated doses are, at best, only approximations. That they need revising frequently is

manifest from the changed attitude of the medical profession toward the employment of acetanilid.

A few of us can remember when chloral hydrate was usually given in doses which are now regarded as exceedingly dangerous.

The synthetics are pressing for recognition. Given a nucleus, the German chemists seem to find linking on radicals a very simple matter and a pastime, so the possible new compounds run into infinity. To what extent our Pharmacopœia shall take note of these is an important question. To deny official recognition to a substance which is "protected by proprietary rights," or "which cannot be produced otherwise than under a patented process," is in accordance with the traditions of ethical medicine and pharmacy. In these words the last Pharmacopœial Convention instructed the Committee of Revision. The next Convention would do well to repeat them.

The American-Pharmaceutical Association stands sponsor for an excellent work, the National Formulary, which is semi-official. Its contents need not be restricted to galenical preparations and formulas. Although the proprietors of many synthetic remedies have shown little consideration for pharmacists, or for the public generally, yet we may be gracious enough to accord for their products a place in this volume, when it is proven that they are possessed of positive merit.

What greater recognition than this can the proprietor in modesty ask, when we are powerless to compel him to conform to any standard of identification and purity?

The proposition to bind the National Formulary in one volume with the Pharmacopœia it is to be hoped will not receive serious consideration. Making additions to the former or changes in the formulas, should remain a simple matter.

Shall standardization be extended?

The physiological effect of a drug is not obtained by administering one of its alkaloids, yet the amount of the most important active principle which it contains is a measure of its value medicinally and commercially. It follows, therefore, that processes for determining this should be multiplied so as to include a number of potent drugs, and Galenical preparations made from them. The present Committee of Revision is to be commended rather than criticised for conservatism in this matter, however.

Assaying drugs is expert work, not simple. It is scarcely possible to devise methods for it which in the hands of the inexperienced will give correct results. These estimations are valuless unless the manipulations are directed with skill and understanding. Make the requirements, and they will be met.

Our Pharmacopœia is not written down to the minimum level of intelligence and ability. It is not assumed that these brief notes will be considered much more than suggestions, but it is hoped that they will prove timely and provocative of discussion.

On motion of Mr. Alpers, the report of the Committee on Revision of Pharmacopœia was received.

On motion of Mr. Remington, duly seconded, the report was referred to Dr. Charles Rice, Chairman of the Committee of Revision and Publication of the United States Pharmacopœia, as a contribution of suggestions from this Association, without recommendation.

On motion, the paper of Mr. Good was received, to take the usual course.

MR. HALLBERG: I desire to move that, inasmuch as Mr. Eliel has been Chairman of the Committee on Revision of the Pharmacopœia for several years, the thanks of this Association be tendered him for the work he has so faithfully performed, together with his associates on the Committee.

The motion was seconded by a number of members and unanimously adopted.

MR. REMINGTON: While a considerable number of members are present, there is a matter I think this Section ought to consider. You know that Prof. Vin Arny, who has taken a great interest in this Section and worked hard for it, and who expected to be here, has been stricken down with hemorrhages, and now lies in a hospital in Cleveland a very sick man. Personally, I feel that as Mr. Arny is a most devoted, enthusiastic worker with the Section, some expression of our sympathy in his affliction should be given, and that we should express our regret at his not being able to be with us. I think it would be very gratifying to him, and I move that such a message be prepared and sent him.

MR. ALPERS: I move that Mr. Remington and Mr. Mayo be constituted a committee for that purpose.

The motion was put and carried unanimously.

Mr. Edward Kremers next presented in abstract, accompanied by blackboard demonstrations, the following paper prepared by Mr. O. Schreiner and himself.

NITROSO DERIVATIVES OF CARYOPHYLLENE AND CADINENE AND THEIR BEARING ON THE CHARACTERIZATION AND CLASSIFICATION OF THE SESQUITERPENES.

BY OSWALD SCHREINER AND EDWARD KREMERS.

While the terpenes have been so well characterized that the determination of their different modifications offers no particular difficulty, and the investigation of these terpenes is being continued along the sure and now well beaten path, the sesquiterpenes, which accompany the terpenes in a large number of volatile oils, are still in a chaotic state. The conditions for the investigation of the hydrocarbons of the formula $C_{15}H_{24}$ are exceeding unfavorable. The sesquiterpenes are known as thick, easily resinifying liquids with a boiling point between the limits 250° and 280°. Of the undoubtedly large number of sesquiterpenes, only three are sufficiently well characterized to warrant their identification.

In 1887, Wallach[1] reported on the hydrochloride of a sesquiterpene

obtained from oil of cade which showed a melting point of 117° to 118°. By heating this hydrychloride with aniline, or with anhydrous sodium acetate in glacial acetic acid solution, the hydrocarbon was regenerated. He obtained this same hydrochloride from oil of patchouli, galbanum, cubebs, and savin, and therefore concludes that these oils all contain the same hydrocarbon, which he calls cadinene.

In 1892, Wallach[2] reported on some caryophyllene derivatives. Caryophyllene, from clove oil, like some of the terpenes, is capable of taking up water and yielding a well characterized hydrate, melting at 96°. From this hydrate, by treatment with phosphorus pentachloride, he obtained a chloride, melting point 63°. In a similar manner he prepared the bromide and iodide, also an ester $C_{15}H_{25}O(NO_2)$, all well characterized compounds. Attempts to regenerate caryophyllene from the hydrate by treatment with dehydrating agents resulted in the formation of an isomeric sesquiterpene which he calls clovene. By the formation of the hydrate and the derivatives prepared therefrom, he showed the sesquiterpene from copaiva oil to be identical with caryophyllene. At the same time he prepared a nitrosochloride of caryophyllene of the melting point 161–163°. Later, Wallach[3] reported on caryophyllene nitrosate of the melting point 148–149°, as well as the piperidene nitrolamine base, melting at 141–143°. In this same article, Wallach reports upon patchoulene generated from patchouli alcohol and concludes from its refractive index that it contains only one ethylene bond. Champacol or guajol, $C_{15}H_{25}OH$, is also reported as melting at 91° and boiling at 288°. Caryophyllene hydrate melts at 96° and boils from 287° to 289°, but the physical appearance and other properties show these two bodies to be different compounds. From the alcohol, by treatment with dehydrating agents, he obtained a hydrocarbon which was deep blue in color but was not further investigated.

Wallach,[4] in 1892, suggested a classification of the sesquiterpenes as far as then known. According to this they may be divided into two groups: those containing two ethylene bonds, and those containing one ethylene bond. Cadinene, which seems to be about as widely distributed as is limonene, is a representative of the first class and is characterized by the formation of the dihydrochloride. It has been shown to be present in the oils of cubebs,[5] savin,[1] cade,[1] betel,[6] camphor,[6,7] galbanum,[8] patchouli,[8] elderberry,[9] coto bark,[10] and olibanum.[11] In all these cases, however, the formation and melting point of the dihydrochloride have been the only evidence of the identity of the hydrocarbons in these oils. Attention must here be called to the tendency of the terpenes proper to change from one into the other through the action of hydrochloric acid, and it is not improbable that similar inversions may take place with the sesquiterpenes. It is, therefore, not at all certain that cadinene really exists in all of these oils. Cadinene is reported by Wallach,[11] who evidently does not interpret

Semmler's results correctly, as existing in asafetida, but Semmler[12] himself shows in his work that the hydrocarbon is not present in the oil but is generated from an oxygenated product by repeated treatment with sodium.

Beckurts and Troeger[13] contribute some interesting observations which seem to point unmistakably toward inversion in the group of the sesquiterpenes. They succeeded in getting from the fraction 260–270° of angustura oil an oxygenated product $C_{15}H_{26}O$. This compound is inactive, has a specific gravity of 0.9270 at 20° and an index of refraction for sodium light of 1.50624. It readily splits off water and is very difficult to obtain. For this compound they propose the name of galipol. From galipol and also from the fractions 250–280° by heating with acetic anhydride in a closed tube they obtained a sesquiterpene of the following properties: sp. gr. 0.9110 at 20°, boiling point 256–260°, $\alpha = + 18°$, $n_D = 1.50374$. This hydrocarbon they call galipene, although in a later article they apply this name to another sesquiterpene. The dihydrochloride melting at 114°–115° and the dihydrobromide melting at 123° were prepared. The original oil is strongly laevogyrate —50°, the alcohol is inactive and the hydrocarbon regenerated from this as well as from fractions of the original oil, is dextrogyrate 18°. From this it appears that an inversion of the sesquiterpene in the original oil has taken place by the treatment with acetic anhydride. In a later article[14] they show that by the use of different dehydrating agents entirely different results are obtained from the same oil. The original oil was again laevogyrate: by treatment with acetic anhydride the optical activity was changed to + 20°; by treatment with phosphorus pentoxide it was changed to — 10°. Further, they were able to isolate an *inactive* sesquiterpene from the oil by fractional distillation. This time they suggest the name of galipene for this sesquiterpene instead of the dextrogyrate variety mentioned above. In a third contribution[15] they report that the dihydrobromide and dihydrochloride formerly reported as galipene compounds are really cadinene derivatives, although they result from a dextro-hydrocarbon, whereas the known cadinene is strongly laevogyrate. The laevogyrate sesquiterpene in the original oil they identify as cadinene. These observations leave the sesquiterpenes in angustura oil at least in a very unsatisfactory condition. Other cases of disagreement in physical properties similar to the above might be given. The results clearly show that two entirely different sesquiterpenes, the one dextro- and the other laevogyrate may both yield the same dihydrochloride. Identification based on such a compound may, therefore, lead to wrong conclusions.

In view of these facts, it appeared highly essential that other derivatives of these sesquiterpenes be made before definitely considering them identical. The success with the nitroso-compounds of caryophyllene led to the attempt to prepare similar compounds of cadinene. These attempts proved fruitless at first, but the conditions for their formation and separation were

finally found. So far, the nitrosate and the nitrosochloride have been prepared; the nitrosite has not yet been separated, as its solutions appear to decompose very readily. With these two additional compounds of cadinene in hand, it is hoped that we have offered a means of more definite characterization of cadinene and thus have contributed toward the clearing up of these doubtful points.

Decidedly different from cadinene is caryophyllene. Wallach[16] states that caryophyllene has not been prepared in a pure state, and he is, therefore, inclined not to lay any stress upon its physical constants, because its refractive index seems to speak for two double bonds, whereas its chemical behavior indicates but one. Thus it forms a *saturated* alcohol by the addition of water.

In this compound, however, the caryophyllene is no doubt changed, as it cannot be regenerated, but always yields an isomer, clovene, which appears to have but one ethylene bond. The results obtained with the caryophyllene prepared by Fritzsche Bros., and the redistilled product, show that, although not absolutely pure, the impurity is so slight as not to influence the refraction to any great extent, and the results in both cases clearly indicate the presence of two ethylene bonds. Wallach further states that caryophyllene gives only liquid addition products with the hydrohalogens. A hydrochloride has, however, been prepared in a solid, nicely crystalline form. The results further show that caryophyllene can be regenerated from this compound, and it is hoped that before long a report on this regenerated caryophyllene can be made and any doubt as to the accuracy of its molecular refraction cleared away.

Attention must here be called to two articles on oil of hops and the sesquiterpene obtained from it by Chapman. The first of these articles[17] is on oil of hops, but includes the preparation of humulene nitrosochloride by conducting nitrosyl chloride into a chloroformic solution of the sesquiterpene, as well as the preparation of the piperidine nitrolamine from the nitrosochloride. The second article[18] is on humulene derivatives in particular and includes the preparation of the nitrosate and the nitrosite. The latter compound is of a deep blue color, but by repeated crystallization from alcohol, or boiling with alcohol for some time, this is changed to a white compound, which on analysis proved to be an isomer of the blue nitrosite. This blue nitrosite Chapman considers as the true compound, and he therefore calls the other an iso-compound. Chapman's humulene nitrosochloride showed a melting point of 164–165° and that of caryophyllene 162–163°. This led Chapman to think that the two might be identical, but he could not obtain a hydrate of humulene under the same conditions that caryophyllene readily yielded this compound. As no other compounds of caryophyllene were at that time known, no further comparisons could be made. With these compounds now at command a comparison shows that the two sesquiterpenes cannot be identical,

although the great similarity in chemical behavior of these two hydrocarbons is striking. Both yield all three nitroso derivatives, and these two are the only hydrocarbons that do yield all of them. Moreover, the nitrosite in each case is blue and yields an isomeric white variety. In the case of caryophyllene this white variety is obtained by the action of light, whereas the humulene iso-nitrosite was obtained by repeated crystallization or by heating for some time with alcohol. Even with humulene nitrosite, it is no doubt more due to the action of light during the process of recrystallization and boiling, than to the action of the alcohol. The great similarity in the behavior of the two compounds makes it highly probable that the blue humulene compound will react similarly on exposure to light as does the caryophyllene derivative. Whether or not a β-compound can be obtained from humulene as from caryophyllene by exposing the solution of the nitrosite to light, experiment alone can answer. In all probability, however, the humulene nitrosite will be found to be capable of undergoing the same changes, and it is hoped that this may be shown experimentally, if some humulene can be obtained. A further analogy between the two hydrocarbons was that both yielded only liquid addition products with hydrochloric acid, but this analogy no longer holds, as the caryophyllene compound has been obtained in a crystalline form. It is highly probable that the humulene hydrochloride might be obtained in a manner similar to that by which the caryophyllene derivative was obtained. The derivatives of the two hydrocarbons, although so similar, show by their melting points that they cannot be identical. The melting points of the nitrosochlorides, as in the case of the terpenes, cannot be used, as it is rather a decomposition point than a melting point; but the other compounds, especially the nitrosite and the compounds obtained therefrom, are characteristic. Purified caryophyllene nitrosite melts at 113°, whereas the corresponding humulene derivative melts at 120–121°; the white compound from caryophyllene nitrosite melts at 112–114°, and humulene isonitrosite at 165–168°. The nitrolbenzylamine bases show still more conclusively the differences between these hydrocarbons. The base was in each case obtained from the nitrosochloride: the caryophyllene base melts at 167° and the humulene base at 136°. Moreover, Chapman obtained the same piperidine base from both the nitrosate and nitrosochloride, whereas caryophyllene nitrosate and nitrosochloride yield different compounds with benzylamine.

The following table clearly shows the analogy and the differences between these hydrocarbons as well as those of a few of the more common sesquiterpenes which have received names. A large number of other sesquiterpenes exist, but these are not yet named and only referred to as sesquiterpenes together with the name of the oil in which they occur.

A glance at the table shows that only three sesquiterpenes, cadinene, humulene, and caryophyllene, have been sufficiently characterized to admit of identification.

The results thus far obtained with these three sesquiterpenes show that the field of the sesquiterpenes is not so discouraging as Wallach had supposed it to be. To quote Wallach's[19] own words: "Um eine sichere Unterscheidung der Sesquiterpene zu ermöglichen, die Isomerieverhältnisse innerhalb der Körperclasse klarzustellen und damit eine sichere Grundlage für Arbeiten über die Constitutionen dieser Verbindungen zu schaffen, beabsichtigte ich in ähnlicher Weise systematisch vorzugehen, wie ich es bei der Gruppe der Terpene gethan habe. Nachdem ich mich davon überzeugen musste, wie undankbar eine solche Arbeit ist, verzichte ich wenigstens auf die systematische Weiterführung und will vorläufig nur noch einige Erfahrungen mittheilen." This was in 1894, and since then Wallach has published no further work on the sesquiterpenes.

COMPARISON OF THE SESQUITERPENES.

	Cadinene.		Caryophyllene.		Humulene.	Clovene.	Cedrene.	Cubebene.	Patchoulene.	Sesquiterpene from Guajol.	Sesquiterpene from Galipol
	Wallach.	S. & K.	Wallach.	S. & K.	Chapman.	Wallach.			Wallach.	Wallach & Tuttle.	Beckurts & Troeger.
Boiling point	274—275°	.....	258—260°	136—137° (20 mm.)	263–266°	261–263°	237°	220°	254–256°	124–128° (13 Mm.)	256–260°
Specific gravity	.918 (20°)	.....	.9085 (15°)	.9030 (20°)	.8977(20°)	.930(18°)	.....	.915(15°)	.939(23°)	.910(20°)	.9110(20°)
Optical rotation	—98.56°	.....	active	—8.96°	inactive	.....	—47.54°	—39.15°	.....	....	+18°
Index of refract	1.50647	.....	1.50094	1.49976	1.5021	1.50066	.....	.....	1.50094°	1.50114	1.50374
Hydrate	.....	.....	96°	.....	not cryst.	.....	.....	.....	56°	91°	liquid
Hydrochloride	117—118°	117—118°	liquid	69–70°	liquid	.....	.....	120–125°	.....	.....	114–115°
Hydrobromide	124—125°	93—94°	liquid	.....	.....	.....	.....	.....	.....	.....	123°
Nitrosochloride	.....	105—110°	161—163°	157–158°	164–165°						
Nitrosate	.....	.....	148—149°	148–149°	162–163°						
Nitrosite	.....	.....	.....	113°	120–121°						
" α-compound	.....	.....	.....	112–114°	165–168°						
" β-compound	.....	.....	.....	146–148°							
Nitrolpiperidine	.....	.....	141—143°	.....	153°						
Nitrolbenzylamine	.....	.....	.....	α=167 β=128	136°						

Experimental.

PHYSICAL CONSTANTS OF CARYOPHYLLENE.

The caryophyllene used in the following experiments was kindly furnished by Fritzsche Bros. of New York. The oil was found to be free from aceteugenol, which usually accompanies caryophyllene obtained by fractional distillation. Upon inquiry as to the method of purification used in making the caryophyllene, the following method of preparation was communicated by Dr. Kleber, of the Garfield laboratories.

Oil of cloves was treated in slight excess with a 7 per cent. soda solution at ordinary temperature and the solution extracted with ether. The ether invariably dissolved some of the sodium eugenol. The ethereal solution is evaporated on a water-bath, at which temperature any of the aceteugenol originally present in the oil of cloves,[20] and dissolved by the ether, is saponified by the sodium present. The crude caryophyllene thus obtained was then thoroughly exhausted of any eugenol by repeated treatment with 5 per cent. soda solution and then rectified by distillation with water vapor. This method of preparation explains the absence of aceteugenol in resulting caryophyllene.

Inasmuch as caryophyllene has up to the present time not been prepared in an absolutely pure state by regeneration from any of its compounds, these latter always yielding an isomer, clovene, and as the physical constants have always been determined on caryophyllene obtained by fractional distillation, it was of interest to note the physical constants of this sample of caryophyllene obtained in the manner above described on a relatively large scale, thus insuring at least as pure a product as can possibly be obtained in a manner other than that of regeneration from its purified derivatives.

Specific gravity.—The specific gravity of caryophyllene was determined in a Geisler pycnometer of very fine bore, the thermometer of which had been carefully compared with a normal instrument from the Reichsanstalt. Two separate determinations gave the following results, with both oil and water at 20° : 0.90345 and 0.90344.

Index of refraction and dispersion.—The refractive index of caryophyllene was determined with Pulfrich's New Refractometer,[28] in which the temperature was carefully regulated by runniug water at 20° through the metallic tubes dipping into the liquid and around the prism. The thermometer used had been carefully calibrated. The index of refraction of the prism used was 1.62165, and the dispersion from C to D was 0.00488, D to F 0.01225, D to G′ 0.02268. The index of refraction found for sodium light and for the three hydrogen lines was as follows, the dispersion between the hydrogen lines being also given :

	Refractive index.	Dispersion.	
Na	1.50024		
Hα	1.49694	.01136	.01834
Hβ	1.50830	.00698	
Hγ	1.51528		

The specific refraction calculated according to the formula $\frac{n^2-1}{n^2+2}\cdot\frac{1}{d}$ for the sodium light is 0.32571 and the molecular refraction is 66.299. The molecular refraction calculated according to Conrady's[21] figures for sodium light for the compound $C_{15}H_{24}$, assuming two double bonds, is 66.153.

Specific Rotation.—The rotatory power of caryophyllene appears not to have been determined before this. Wallach states that it is active, but gives no figures. Its optical activity was determined with Landolt-Lippich's triple shadow instrument, the temperature being maintained constant at 20° by passing water through a jacket around the tube. The tube was 100 Mm. in length. Ten readings were made which agreed within 0.05 of a degree, and the average of which is 8.03°, the direction of rotation being laevo. Hence, $[\alpha]_D = -8.89$ at 20°.

In order to obtain, if possible, the oil in a still purer form, and also to test the oil as furnished by Fritzsche Bros. as to its behavior on boiling, it was subjected to fractional distillation under diminished pressure. The following fractions were obtained:

Fraction A. This fraction was collected until the thermometer became constant at 136° with a pressure of 20 Mm.

Fraction B. This was collected between 136° and 137° under a pressure of 20 Mm. Nearly all of the oil came over at this temperature. A straw yellow residue was left in the flask. The other fractions were colorless.

The refractive index of fraction A was found to be for sodium light, 1.49957 at 20°. The refractive index of the residue was 1.50033. The intermediate fraction, B, which boiled at 136°–137° under 20 Mm. pressure, was perfectly colorless and showed a refractive index for sodium light of 1.49976 at 20° and a specific gravity of 0.90301 at 20° 20°. The molecular refraction as found is 66.271: calculated for two double bonds it is 66.153. The rotation of this fraction was found to be 8.09 laevo, hence $[\alpha]_D = -8.959$ at 20°.

A table showing the physical constants of caryophyllene as here found and those given by Wallach[16] for caryophyllene obtained by fractional distillation is given.

PHYSICAL CONSTANTS OF CARYOPHYLLENE.

	Wallach.	Schreiner & Kremers.	
		As obtained from Fritzsche Bros.	Dist. under 20 Mm. pressure.
Boiling point	258°-260°	——	136°–137°
$[\alpha]_D$	active	—8.89	—8.959
n_D	1.50094	1.50024	1.49976
Sp. gr.	0.9085 (15°)	0.9034 (20°)	0.9030 (20°)

An examination of the constants as given by the caryophyllene as it was obtained from Fritzsche Bros. and the redistilled product, shows that by the further fractionation under diminished pressure the optical rotatory power was slightly increased, and both the specific gravity and index of refraction slightly decreased. There can be no doubt but that the caryophyllene obtained by the method described is a purer product than that obtained by Wallach by fractional distillation, and as the difference in the constants given is in the same direction as is the difference between the original caryophyllene and the redistilled product, there can be no doubt but that this latter is the purest sample of caryophyllene so far obtained. Whether or not it will be possible to obtain caryophyllene in a purer form by regeneration from some of the derivatives to be described later cannot yet be definitely answered. An oil is regenerated from several of these, as will be pointed out later, but whether this is caryophyllene or its isomer clovene, as Wallach [27] found on trying to regenerate caryophyllene from its hydrate, has on account of want of material not been shown. It is highly probable, however, that the hydrocarbon regenerated from the hydrochloride is caryophyllene and not clovene.

Caryophyllene Derivatives.

caryophyllene nitrosite.

Caryophyllene nitrosite was prepared by a method similar to the one employed by Chapman [18] for the preparation of humulene nitrosite. The following is the method used: 25 Cc. of caryophyllene, 25 Cc. of low boiling petroleum ether and 25 Cc. of a saturated solution of sodium nitrite, are mixed together. 25 Cc. of glacial acetic acid are now added slowly, continually rotating the solution. On adding the acid the upper petroleum ether layer becomes of a beautiful blue color, which becomes darker as more acid is added. When all the acid has been added the solution is allowed to stand for about ten minutes, and then strongly cooled in a freezing mixture of salt and ice for about two hours, during which time crystallization sets in and the upper blue layer solidifies into a solid mass of deep blue crystals. It happened quite often that not a single crystal was obtained when proceeding as described, and this was a great source of annoyance and loss of material in the early part of the work. This can be obviated by shaking the strongly cooled liquid violently and again setting aside in the cold. Crystallization usually took place when so treated, and when this failed the merest trace of solid nitrosite brought in contact with the solution caused it to solidify into a mass of crystals immediately. It sometimes happens that, due to the great cold and supersaturation of the lower aqueous layer of sodium acetate solution, the latter salt crystallizes out with the nitrosite. In this case it can readily be separated from the nitrosite by transferring the mixture to a force filter and first washing with alcohol and then with water and lastly with a little more alcohol, in which the nitrosite is but sparingly soluble, and then drying on a porous plate.

Chapman recommends in the case of humulene, that the mixture of humulene, petroleum ether and sodium nitrite solution be strongly cooled before adding the acid. This method of procedure was tried on caryophyllene, but proved to be less satisfactory than the method given above. It was noticed that after the crystals had been separated, and the mother-liquid allowed to warm up slightly, that a reaction set in, liberating more nitrous acid. Experiment showed that the action of acetic acid on sodium nitrite is very much retarded, if not completely arrested, at this low temperature, and therefore does not liberate as much nitrous acid as is required. The solution itself is not as blue as it is in the modified method, shading more into the green. The strongest argument against this procedure is the yield of nitrosite obtained, amounting to only 6.28 per cent. as an average of many experiments. On modifying the method as already described, by allowing the nitrous acid to be liberated and to act upon the caryophyllene at the ordinary temperature and then cooling strongly, the solution obtained was of a much deeper and purer blue color, and the yield rose to 12.61 per cent. as an average, the highest yield obtained being 14.03 per cent. A second crop could be obtained in but a few cases and was generally very pale and impure.

Throughout this work it is highly essential that the solution be kept in the dark, or at least in diffused light, as the nitrosite is readily changed by light as will be pointed out more in detail later. The melting point of the nitrosite obtained by the method given above varied in the different samples from 106 to 108°. The nitrosite was recrystallized from hot alcohol in the dark, in which it is very soluble, but which deposits the nitrosite in beautiful deep blue needles on cooling. The crystals, separated on a force filter and washed with a little alcohol and dried, showed a melting point of 113°. A second recrystallization did not change the melting point. The compound is exceedingly stable in the dry form, as a redetermination of its melting point three months later showed it to be 113° as before. The nitrosite when heated is perfectly stable up to its melting point, but when this is reached a gas is given off and the liquid nitrosite becomes green and finally brown.

A nitrogen determination of the purified product gave the following results:

I. 0.2076 Gm. of substance gave 20.1 Cc. of moist nitrogen at 25.6° under a pressure of 729 Mm.

II. 0.3394 Gm. of substance gave 31.3 Cc. of moist nitrogen at 25.1° under a pressure of 736 Mm.

Calculated for $C_{15}H_{24}N_2O_3$.	Found.	
	I.	II.
10.03 per cent.	10.29 per cent.	9.93 per cent.

Great care had to be exercised in making the combustion on account of the decomposition of the nitrosite at its melting point. The part of the

combustion tube containing the nitrosite had to be kept perfectly cold, while the other parts of the tube were being heated to redness.

Molecular Weight of the Nitrosite.

A molecular weight determination of the nitrosite was made with Beckmann's freezing point apparatus, using benzol as solvent. The solution is deep blue and the molecular weight found shows that the nitrosite is monomolecular.

$C_{15}H_{24}N_2O_3 = 279.45$.

No. of Gm. diss. in 100 Gm. benzol.	Lowering of the freezing point.	Molecular weight.
0.9130	.165	276.66
1.5860	.297	267.00

Optical Rotation of the Nitrosite.

The nitrosite was found to be optically active. On account of the deep blue color of its solutions, only a quite dilute solution, together with only a short column of liquid and an intense sodium flame, could be used. The solution used was of the strength 0.3040 Gm. in 19.1681 Gm. of benzol of sp. gr. 0.8795 at 20°, which is equivalent to 1.3949 Gm. of nitrosite in 100 Cc. of benzol. The angle of rotation observed in a 50 Mm. tube was 7.18° dextro, from which $[\alpha]_D = +102.95$. On account of the dilute solution and the short tube which had to be employed, the above result cannot in the least be compared in accuracy with that given for caryophyllene, but as the substance is so very active the experimental errors influence the result to a less degree than they would if it were not so active. There can be no doubt that the figure 102.95 is not very far from its true value. The high rotatory power of the nitrosite is all the more surprising that it is dextro, whereas that of caryophyllene itself is lævo.

Nitrosite and Benzylamine.

Nitrosite and benzylamine were heated together in alcoholic solution for a short time. Reaction took place readily as was indicated by the change of color from blue to yellowish brown. On cooling crystals separated. These were collected, and treated with water and a little diluted nitric acid and well washed with water on a force filter to separate the benzylamine salt. The remaining substance was dissolved in hot alcohol and allowed to crystallize. Crystals separated in pure white needles, which showed the melting point of 167°. This nitrolamine base yielded by the nitrosite is identical with the one given by the nitrosochloride, but different from that obtained from the nitrosate, as will be seen later.

Nitrosite and Benzoyl Chloride.

Caryophyllene nitrosite in benzol solution was treated with benzoyl chloride and heated for some time. No reaction took place, as was indicated by the blue color of the solution remaining unchanged. The mix-

ture was allowed to set in the dark, but after several weeks it was still of a deep blue color. This experiment confirms the view that in the blue compound there is present the true nitroso group.

The Action of Light on Caryophyllene Nitrosite.

Chapman[23] reports that from the mother liquors of humulene nitrosite there separated several other crops of crystals which were much paler than the first crop. Upon recrystallizing these from alcohol they were completely colorless. A nitrogen determination showed this white compound to contain as much nitrogen as the blue compound, and he therefore considers it an isomer of the blue humulene nitrosite. The blue he calls the nitroso, and the white the isonitroso compound. He was able to get this same white compound by repeated crystallization of the blue, or by a continued boiling of its alcoholic solution. Attempts to prepare a similar white compound from the blue caryophyllene nitrosite have already been reported upon in a preliminary paper.[24] Due to want of material, only a small quantity, too small to allow of purification, and not much more than sufficient to make a melting point determination could be made, as the yield of the white compound from the blue is very small. The melting point there given is 53°–56°. An examination of this compound has shown that it was largely contaminated with sodium acetate, coming no doubt from the presence of sodium acetate in the impure nitrosite used in the experiment.

When more caryophyllene was kindly furnished by Fritzsche Bros. this year, it was decided to study this interesting change more in detail. In a former report the alcoholic solution of the nitrosite was boiled until the color faded away, and then set aside to crystallize. By this method a large amount of oil and a few crystals were obtained. The method was again tried, but the yield of the white compound was usually exceedingly small, and in many cases failed to appear altogether. It was, therefore, thought that the long boiling was detrimental to the change desired, and so the method of mixing the nitrosite with alcohol, in which it is but sparingly soluble, and allowing it to stand for a long while, was resorted to, in the hope that the change into the white compound would take place in the same manner as did that of Chapman's humulene nitrosite by repeated crystallization. A similar solution was made in benzol, in which the nitrosite is very soluble, 100 Gm. of benzol dissolving 75 Gm. of nitrosite. After standing for several weeks no change was noticed.

It had been observed that the reaction with the boiling alcohol took place much quicker on bright days than on cloudy days; especially was this remarked one rainy day when the solution had to be boiled almost the entire day before its color changed, whereas on brighter days the reaction was complete in a couple of hours. Light was therefore thought to play some part in this change, and so the above solution in benzol, and magma of crystals in alcohol, were exposed to the sunlight, when a most remark-

able reaction occurred. The perfectly clear deep blue benzol solution almost immediately began to give off a gas and to become paler in color, while small felt-like and perfectly white crystals began to separate. The evolution of gas and separation of white crystals kept on until in less than an hour the transparent blue benzol solution had changed to a mass of perfectly white crystals. The magma of blue crystals in the alcohol, however, behaved quite differently. At first no gas could be noticed, but later a few bubbles rose, which were small and few in number. The quantity of blue crystals was continually diminishing, and in about an hour the blue magma had been changed to a clear yellowish solution with a drop of oil at the bottom. The results of this experiment led to a more detailed study of the action of light on the blue nitrosite in benzol and alcohol. As the compounds thus obtained were found to be different, these will be referred to for the present as α- and β-compounds, the α being obtained from the alcoholic solution, and the β from the benzol solution.

ACTION OF SUNLIGHT ON THE NITROSITE IN BENZOL.

Investigation of the Liberated Gas.

A large quantity of the nitrosite was dissolved in benzol and put in a flask provided with a rubber stopper and bent glass tubing, the end of which dipped below the surface of the water in a large dish. The nearly full flask was then set in the sunlight. In a short while the evolution of gas was going on lively, and when the air was thought to have been driven from the tube, the gas was collected in a bell-jar provided with a stop-cock at the top, thus serving as a gasometer. The colorless gas thus obtained was not combustible, nor was it able to support the combustion of a burning taper of wood. It was not absorbed by potassium hydrate solution. The gas appears, therefore, to be nitrogen.

A quantitative determination of the gas evolved was attempted as follows. 0.500 Gm. of nitrosite were placed into the funnel of a nitrometer which had been completely filled with mercury. A few cubic centimeters of benzol were added and the solution then allowed to flow into the nitrometer by turning the stopcock. The funnel was then rinsed with several other small quantities of benzol, and each washing allowed to run into the nitrometer. In this manner all of the nitrosite was gotten into the nitrometer. The completely filled nitrometer tube was then exposed to the sunlight. When the reaction was over, the volume of gas liberated was found to be 14.7 Cc. at a temperature of 22.8° and under a pressure of 737 Mm. The tension of benzol vapor is given by Regnault[9] as 75.65 for 20° and 120.24 for 30°. Interpolating for 22.8° the vapor tension is 88.14. From these figures the amount of nitrogen liberated is 0.0145. The total amount of nitrogen present in the 0.500 Gm. of nitrosite is 0.0501. Thus 28.94 per cent. of the total nitrogen present is liberated. This is not an absolutely accurate figure, as the volume measured is influenced by

the volume of the white crystals which hang on the sides of the tube, and also on account of the interpolation made for the tension of benzol vapor between such large limits.

β-compound from the nitrosite.

The β-compound was prepared in the manner already given by exposing a solution of the nitrosite in benzol to sunlight, collecting the small felt-like crystals on a force filter, and washing with benzol. The average yield of this compound from the nitrosite was 12 per cent. The mother-liquor on evaporation left a heavy oil which could not be induced to crystallize.

The substance thus obtained was pure white and showed a matted felt-like mass of crystals under the microscope. Its melting point is 146°–148°. At this temperature it decomposes similar to nitrosite, with evolution of gas. The compound is insoluble or but sparingly soluble in benzol, alcohol, ether, chloroform and carbon disulphide. It is soluble in boiling ethyl acetate, but it cannot be again recovered in a crystalline form. The ethyl acetate on spontaneous evaporation leaves a brownish, gummy residue, which cannot be induced to crystallize.

The β-compound reacts readily with benzoyl chloride and also with benzylamine, but no crystalline compounds have, up to the present time, been obtained from the products of the reactions.

This compound will be reported upon more in detail later.

THE ACTION OF COLORED LIGHTS ON THE BENZOL SOLUTION OF THE NITROSITE.

Having thus found that the composite white sunlight effected the decomposition and molecular changes of the nitrosite, it was thought of interest to notice which of the colors produced this effect. For this purpose ten salt-mouth bottles were each fitted with a cork through which was passed a narrow specimen tube, the mouth of which was just flush with the upper surface of the cork. The bottle was then filled with one of the solutions given in the table below, and into the specimen tube was introduced about a cubic centimeter of a solution of the nitrosite in benzol and stoppered with a cork which had a slight notch to allow the escape of the liberated gas. The colored solutions were made as near as possible of the same intensity. These flasks were then set in the sunlight, the colored solution acting as a screen and absorbing certain parts of the spectrum. The time was then noticed when gas was first liberated and also when crystals first began to separate. The results can best be seen from the following table:

ACTION OF COLORED LIGHTS ON THE NITROSITE IN BENZOL.

Colored solution.	Evolution of gas.	Separation of crystals.	Color of solution after 30 min.	Remarks.
Aniline violet	.....	19 min.	Very blue.	
Amm. copper sulph	No change after several days.			
Copper sulphate	Crystals separated after five hours.			Solution very blue.
Chromium sulphate	.....	13 min.	Quite blue.	
Nickel nitrate	5 min.	29 min.	Very blue.	
Potass. chromate	1 min.	8 min.	Almost colorless.	40 min. complete.
Potass. dichromate	.....	9 min.	Almost colorless.	40 min. complete.
Cobalt nitrate	10 min.	12 min.	Quite blue.	
Eosin	.....	13 min.	Light blue.	
Water	6 min.	9 min.	Almost colorless.	40 min. complete.

These results show that the region of activity lies in the yellow and orange of the potassium chromate and dichromate. The green and red colors are also active, but not the blue. The copper sulphate solution protected the compound for several hours, while the ammonium copper sulphate protected it for days. This action of the blue light also explains the peculiar phenomenon noticed, namely, that the yellow light was more active than white light. With white light the compound protects itself by its own blue color, whereas with the colored light this effect is of course absent. It was at first somewhat surprising to notice that the aniline violet solution allowed the action to go on, as it would naturally be supposed that the violet would protect the compound in the same manner as did the blue. It must, however, be remembered that aniline violet allows some of the red rays to pass through it, and that no pure violet is obtained in this way, and it may therefore be due to the red rays that the reaction takes place. The same argument as to purity of color applies to the other solutions, and it was therefore thought to expose a solution of nitrosite in benzol to the pure colors of the spectrum.

Artificial lights, such as a light from a Welsbach burner or that of the electric arc, we found to be also active, though in a less degree than sunlight. The spectrum of the electric arc was tried. For this purpose a series of tubes about 8 Mm. in diameter was mounted on a card, and the spectrum thrown upon them. The tubes were then filled with the solution. In order to obtain a sufficiently large enough spectrum to work with, the tubes had to be removed ten feet from the lamp, but this weakened the

light, so that after several hours the reaction had progressed but little. The tubes in the red and yellow of the spectrum had changed to green, whereas the others were still of a pure blue color, indicating that it is the red end of the spectrum which produces the reaction.

These experiments are being continued with the spectrum of the sun and will be reported upon later.

ACTION OF SUNLIGHT ON THE NITROSITE IN ALCOHOL.

α-Compound from the Nitrosite.

5 Gm. of caryophyllene nitrosite were mixed with 20 Cc. of absolute alcohol, and exposed to the sunlight. The blue crystals gradually dissolved in the alcohol to form a colorless or only slightly yellowish solution. At first no gas appeared to be given off, as is the case with the benzol solution, but later, bubbles of gas could be seen rising to the surface. In the case of the benzol solution the liberated gas has been shown to be nitrogen, but as nitrogen is but slightly soluble in alcohol, it appears that the gas liberated from the alcoholic solution is one of the more soluble oxides of nitrogen, but it could not be investigated for want of material. The solution has the odor of spirit of nitrous ether or aldehyde. The alcoholic solution was allowed to evaporate spontaneously. An oil remained, from which crystals separated in radiating needles which were collected and pressed on a porous plate. The yield of this substance is exceedingly small, amounting to only 5 per cent. of the nitrosite used, and when it is considered that caryophyllene yields this latter only to the extent of about 12 per cent., the yield of the α-compound from caryophyllene is only 0.6 of one per cent. The oily by-product, in working with these small quantities, had to be sacrificed in order to obtain at least a small amount of the solid substance.

The crystals thus obtained are white and have an entirely different appearance from those obtained from the benzol solution. The melting point of the α-compound is 113–114°; that of the β-compound 146–148°. The α-compound is readily soluble in both alcohol and benzol, whereas the β-compound is insoluble in these solvents.

A nitrogen determination gave the following figures:

0.1151 Gm. of substance gave 10.8 Cc. of moist nitrogen at 25°, under a pressure of 741.5 Mm.

Calculated for $C_{15}H_{24}N_2O_3$.	Found.
10.03 per cent.	10.19 per cent.

Molecular Weight of the α-Compound.

A molecular weight determination was made by the freezing point method, using benzol as solvent. The results indicate a mono-molecular compound.

$C_{15}H_{24}N_2O_3 = 279.45.$

Gms. of substance in 100 Gms. of benzol.	Lowering found.	Molecular weight.
0.5069	0.104	243.68
1.0379	0.210	247.11

The last solution was used to test the rotatory power of the α-compound. In a 200 Mm. tube it showed a rotation of a few minutes dextro. The α-compound is therefore either slightly dextro-gyrate or perhaps even inactive.

MOTHER-LIQUOR FROM CARYOPHYLLENE NITROSITE.

The mother-liquor from the nitrosite was well washed with water to free it from any acetic acid and sodium salt. The blue liquid was then put in a flask provided with a rubber stopper and bent glass tubing, so that the liberated gases could be collected over water. The flask was nearly quite filled with liquid, and then exposed to sunlight. Rapid evolution of gas occurs, the liquid changing to green, and finally to yellow. A solid crystalline substance separates out as the decomposition goes on. This was collected on a force filter, and washed with petroleum ether and alcohol. It has the same appearance as the β-compound obtained from the blue nitrosite by exposure of its benzol solution to light. It shows a melting point of 144° with decomposition, that of the β-compound is 146–148°. The gas liberated proved to be nitrogen containing traces of nitric oxide.

The mother-liquor, after filtering off the white compound, was subjected to steam distillation, and after drying an attempt was made to fractionate it. This proved to be unsatisfactory, as the oil, after the petroleum ether is distilled off, has such a high boiling point that decomposition takes place. With more material, an attempt will be made to fractionate the oil under diminished pressure.

As the amount of nitrogen given off from a given amount of pure nitrosite had been determined, it was thought of interest to determine how much nitrosite was still left in the mother-liquor, by measuring the volume of gas given off from the mother-liquor of a known amount of oil. For this purpose the mother-liquor from 65 Cc. of caryophyllene which had yielded 6.100 Gms. of nitrosite was treated as above and the gas collected. 850 Cc. of gas were obtained. Since 1 Gm. of pure nitrosite evolves 23.2 Cc. of gas, it follows that there were in solution in the mother liquor about 36.6 Gms. of nitrosite, or six times as much as had been obtained.

CARYOPHYLLENE NITROSOCHLORIDE.

Wallach has succeeded in making a small quantity of nitrosochloride of which he reports the melting point to be 161–163°. He complains of the exceedingly small yield of the nitrosochloride, and as he found the nitrosate to give a much larger yield, he turned his attention to a study of

the latter compound. Attempts to prepare the nitrosochloride after Wallach's general method for the preparation of nitrosochlorides, namely treatment of the oil in glacial acetic acid and ethyl nitrite with a solution of concentrated hydrochloric acid in glacial acetic acid, proved to be highly unsatisfactory, the yield being exceedingly small, and often nothing separated. That nitrosochloride was formed was shown by the intense bluish-green color of the solution, as well as by the fact that after washing the liquid with cold water to separate the acetic and hydrochloric acids, and then dissolving the remaining heavy green oil or pasty mass in alcohol, and treating with benzylamine, a large amount of the nitrol benzylamine base could be obtained. It was therefore thought that the nitrosochloride was formed, but could not be separated because it was so very soluble in the mixture. Other solvents were therefore tried in the hope of finding one in which the nitrosochloride would be insoluble, but without result. In each case the liquid became blue or green, but no crystals could be separated. It was finally found that if the alcoholic solution was allowed to stand for some time, exposed to the light, the color faded away completely and white crystals separated. This led to the following method :

5 Cc. of caryophyllene, 5 Cc. of alcohol, 5 Cc. of ethyl acetate, and 5 Cc. of ethyl nitrite, are mixed and well cooled in a freezing mixture. 5 Cc. of a saturated solution of hydrochloric acid gas in alcohol are then added slowly, continually rotating the flask. After allowing the solution to stand for about an hour in the cold, it is exposed to the light. The blue color soon fades away and crystals begin to separate. The complete separation requires several days or even weeks, during which time the solution is best kept cold, although it may be allowed to warm up without any serious difficulty, as the nitrosochloride is fairly stable, even while in contact with the mother-liquor. In this respect it is quite different from that of most of the terpenes. The crystals are then collected and washed with alcohol.

A more thorough study of the changes occurring in the method of making the nitrosochloride is now going on and will be reported upon in the near future.

The melting point, or rather decomposition point, of the nitrosochloride thus obtained is 158°.

Nitrosochloride and Benzylamine.

Nitrosochloride and benzylamine, when heated together, reacted readily. The product was treated with alcohol and set aside to crystallize. On cooling, a mass of fine needle-shaped crystals separated. These were collected, washed with alcohol and then with water, to separate any salts of benzylamine. The washed product was then recrystallized from alcohol, from which it separates on cooling in pure white needles of the melting point 167°.

The mother-liquor of the above reaction, after the first crop of needle-shaped crystals had separated, deposited on standing a second crop of crystals of an entirely different appearance. Nodules of crystals formed on the sides and bottom of the dish. These were separated, and purified by washing with water and recrystallization from alcohol. They did not separate on cooling as needles throughout the mass, as did the first crop, but in nodules on the bottom and sides of the dish, and formed more slowly. The melting point of this compound is 128° whereas that of the first crop is 167°. Moreover, the crystallization and the melting point of the second crop agree with the nitrolbenzylamine base obtained from the nitrosate, which has a melting point of 128°. There appear therefore to be two different nitrolbenzylamine bases which for the present may be designated as α-nitrolbenzylamine base, melting at 167°, and β-nitrolbenzylamine base, melting at 128°.

Nitrosochloride and Aniline.

Aniline does not react with the nitrosochloride to form a nitrol base, but in a different manner. When nitrosochloride is heated with alcohol and aniline an energetic reaction takes place and the solution becomes of a deep purple color.

Wallach[25] has already pointed out that aniline does not always act toward these compounds as do the other bases. By acting on pinene nitrosochloride with aniline in alcoholic solution, he finds that the nitrosochloride is split up, with the formation of nitrosochloride which combines with the aniline to form diazobenzolchloride, and the latter reacts with excess of aniline to form amidoazobenzol, while the pinene is regenerated.

From the behavior of the caryophyllene nitrosochloride toward aniline, it is highly probable that a similar reaction has here taken place, although this has up to the present not been proven on account of want of material.

Molecular Weight of the Nitrosochloride.

A molecular weight determination of the nitrosochloride by the freezing point method, using benzol as solvent, gave the following results:

$(C_{13}H_{24}NOCl)_2 = 537.78.$

Gm. of substance in 100 Gm. of benzol.	Lowering found.	Molecular weight.
0.4459	0.047	474.35
0.5375	0.050	537.47

On account of the slight solubility of the nitrosochloride in benzol, solutions stronger than the above could not be prepared. From the results it is seen that the nitrosochloride adds itself to the already large class of bis-nitroso compounds.

CARYOPHYLLENE NITROSATE.

Only a preliminary report will here be made on this compound. It was prepared as follows: 5 Cc. of caryophyllene, 5 Cc. of glacial acetic acid, and 5 Cc. of ethyl nitrite, were mixed and well cooled in a freezing mixture. A mixture of 5 Cc. of conc. nitric acid and 5 Cc. of glacial acetic acid are now added slowly, continually rotating the flask. When the solution has become dark green some alcohol is added, and allowed to stand in the freezing mixture for about two hours, during which separation of the nitrosate takes place. It is collected on a force filter, washed with alcohol and dried on a porous plate. Melting point, 148–149° with decomposition. Molecular weight determinations show it to be a bis-nitroso compound.

Nitrosate and Benzylamine.

Caryophyllene nitrosate was boiled with benzylamine and alcohol, until completely dissolved. The alcoholic solution deposited, on standing, nodules of crystals on the sides and bottom of the dish. These were separated, washed with alcohol and water, and recrystallized from alcohol. The crystallization was again in nodules, and showed a melting point of 128°. This nitrol-base is therefore identical with the β-base obtained from the nitrosochloride.

HYDROCHLORIDE OF CARYOPHYLLENE.

Wallach [16] reports that caryophyllene is capable of adding hydrochloric acid, but that the resulting compound is liquid. The same is reported of humulene by Chapman. [26] Inasmuch as the hydrochloride of cadinene forms readily and the latter compound has been so important in characterizing cadinene as well as a step toward obtaining cadinene in a pure condition by regeneration with aniline or anhydrous sodium acetate, it was thought of interest to make some experiments during the cold winter weather to see if crystallization could not be induced by keeping the liquid cold for a long time. With this end in view, caryophyllene was dissolved in an equal volume of ether, and the solution saturated with hydrochloric acid gas. This solution was then exposed to the cold outside the laboratory. The temperature varied only a few degrees from 30° below zero C. for several days. As the ether evaporated, the solution became thicker, until it entirely gelatinized to a transparent jelly and could be turned upside down without the slightest change in the meniscus, but no crystals separated. When brought into the laboratory, the gelatinized mass became fluid. About an hour later small crystals were noticed at the edge of the oil, and soon more made their appearance in the oil. The quantity was, however, very small, and could not be increased by standing. At the temperature of the laboratory these crystals could hardly be expected to form in large quantity, but when it was exposed to the cold, the oil became so very viscous that crystallization was hindered. It was finally

found that by exposing a mixture of the liquid hydrochloride and alcohol, which dissolves it but sparingly, to the cold, the lower layer of undissolved liquid hydrochloride crystallized to a solid mass. In this manner a large crop of crystals of the hydrochloride could be obtained. These were then pressed on a porous plate to free them from any adhering oily products, and recrystallized from hot alcohol. Continued boiling with alcohol decomposes the hydrochloride with liberation of hydrochloric acid. The melting point of the recrystallized product is 69°.

Exception must therefore be taken to Wallach's statement that caryophyllene does not yield a crystalline addition product with hydrochloric acid.

The chief interest in this hydrochloride lies in the fact that it can be obtained in fairly large yields and can be readily purified, and in that it offers a possibility of regenerating the caryophyllene from the purified derivative in a manner similar to that employed by Wallach for the regeneration of cadinene from its hydrochloride. Wallach [22] attempted to regenerate the caryophyllene from its hydrate by treatment with phosphorus pentoxide. He did not succeed in getting caryophyllene, but obtained an isomer of it, which he called clovene.

The material at hand does not allow of settling the question whether or not caryophyllene is regenerated from this hydrochloride, but the following experiment speaks strongly in favor of the liberated hydrocarbon being caryophyllene, and not clovene. A small sample of the hydrochloride was treated with anhydrous sodium acetate and glacial acetic acid, as recommended by Wallach[27] for the regeneration of cadinene from its hydrochloride, and the mixture boiled, which was then treated with water, producing a turbidity indicating that an oil had been regenerated. This oil was shaken out with petroleum ether, and this solution treated with a saturated solution of sodium nitrite, and glacial acetic acid added. The petroleum ether solution turned a beautiful blue, as it does in the case of the nitrosite of caryophyllene. The quantity was too small to get any crystals. Clovene, obtained not by regeneration from the hydrate, but from the residues in making the hydrate, when treated in the same manner, gives not even the slightest trace of blue coloration. Wallach[16] states that clovene is not capable of uniting with nitrosochloride, and it is therefore also incapable of uniting with the oxides of nitrogen. As the above regenerated oil does react with this reagent, and in the same manner as does caryophyllene, it is highly probable that caryophyllene can be regenerated from its hydrochloride. If this be possible, it offers a method for obtaining caryophyllene in an absolutely pure state. It is hoped that with more material at command this interesting point can be sufficiently cleared up and a pure sample of regenerated caryophyllene prepared.

CADINENE DERIVATIVES.

Pure cadinene was prepared according to Wallach's[1] method from crude oil of cade as follows: The crude oil of cade was subjected to steam distillation and the distillate repeatedly shaken with a solution of caustic potash to free it from phenols, dried over solid caustic potash and then fractionated. The fraction coming over between 260° and 280° was diluted with an equal volume of ether, and the solution then saturated with dry hydrochloric acid gas. The ether was allowed to evaporate spontaneously in a cool place. The dihydrochloride separated in fine needles from the black tarry mass. The crystals were collected on a force filter and washed with alcohol and dried on a porous plate. The yield was small and sometimes no crystals could be obtained. Upon recrystallization from hot ethyl acetate the dihydrochloride was obtained in white needles melting at 117°–118°.

For the regeneration of the cadinene from its dihydrochloride Wallach's[27] directions were followed. The dihydrochloride was treated with an equal weight of anhydrous sodium acetate and four times the amount of glacial acetic acid and heated to boiling for about an hour in a flask provided with a reflux condenser. The mixture was then treated with water, the separated hydrocarbon well washed with water and then subjected to steam distillation. The pure hydrocarbon was then dried over caustic potash.

Pure cadinene shows a great tendency to resinify when exposed to the air, and it was noticed in the above distillation that the hydrocarbon had already changed slightly, but on drying with solid caustic potash the latter became covered with a resinous deposit and the hydrocarbon was left perfectly colorless and had a pleasant odor. The cadinene retained these characteristics as long as it remained in contact with the solid caustic potash, but became colored and lost its pleasant odor when exposed to the air without the presence of this reagent. In this manner the cadinene was kept in a pure condition several months. From the cadinene thus obtained the nitrosate and the nitrosochloride were prepared by the following methods.

CADINENE NITROSATE.

The nitrosate was prepared as follows: To one part of cadinene contained in a flask which was kept cool by a freezing mixture were added three parts of glacial acetic acid; the solution was clear at ordinary temperature, but became turbid when cooled. One part of ethyl nitrite was then added, forming a clear green solution, and then a mixture of one part of concentrated nitric acid and one part of glacial acetic acid was added gradually. The solution remained clear until the last portions were added, when it became turbid and a precipitate settled after a few minutes. To the turbid solution was added an equal volume of alcohol which caused a dense precipitate of the nitrosate. This precipitate was

collected on a force filter after standing a short time, washed with alcohol and placed on a porous plate to dry. The yield was 23.2 per cent. The filtrate gave no further precipitation with alcohol, but on the addition of one part of water a second precipitate was obtained. This was also collected and washed with alcohol and dried on a porous plate. The yield in this case was 18.8 per cent., making a total yield of 42 per cent. Another experiment gave a yield of 20.6 per cent. for the first crop, and 6.5 per cent. for the second crop, making a total of 27.1 per cent.

Cadinene nitrosate is a light, white powder, sparingly soluble in cold alcohol, more readily in hot alcohol and in benzol, but cannot be recovered in crystalline form from these solvents, as they leave a very viscous residue which cannot be induced to crystallize on evaporation. It melts from 105° to 110° with decomposition.

CADINENE NITROSOCHLORIDE.

The nitrosochloride was prepared as follows: to one part of cadinene, contained in a flask kept cool by a freezing mixture, were added three parts of glacial acetic acid and one part of ethyl nitrite. One part of a saturated solution of hydrochloric acid gas in glacial acetic acid was then added gradually. The solution became dark green, and after the addition of a little alcohol and standing for about two hours, a white precipitate was deposited. The precipitate was collected, washed with alcohol and dried on a porous plate, the yield being 3.5 per cent. This compound is a white powder, melting at 93°–94° with decomposition.

A more thorough study of these derivatives will be made and reported upon later.

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[19] Ann., 279, p. 391.
[20] Jour. f. pr. Chem., 164, p. 144.
[21] Ztsch. f. phys. Chem., 3, p. 226.
[22] Ann., 271, p. 294.
[23] Jour. Chem. Soc., 67, p. 783.
[24] Pharm. Archives, 1, p. 209.
[25] Ann., 252, p. 132; 258, p. 343.
[26] Jour. Chem. Soc., 67, p. 61.
[27] Ann., 238, p. 84.
[28] Ztsch. f. phys. Chem., 18, p. 294.
[29] Landoldt u. Börnstein, Tabellen, p. 73.

MR. ALPERS: I am very thankful to Prof. Kremers for the reading of this excellent paper, for it explains to me some peculiar experiences that I had in the course of recent investigations, and which I could not explain before. In analyzing an ethereal oil, gained from the rhizome of aralia nudicaulis, I isolated a sesquiterpene, for which I pro-

posed the name of "araliene," as according to all reactions it differed from cadinene, caryophyllene and humulene. I prepared halogen derivatives from it, and also nitroso-compounds of a blue color. In trying to crystallize these nitroso-compounds, I remember to have seen on two occasions a white substance, the presence of which I attributed to some unexplainable influences or changes. I did not attempt to examine them further, but I am now convinced that they were such isomers as Prof. Kremers has described.

On motion of Mr. Mayo, the paper was accepted and ordered to take the usual course.

The Secretary read a list of papers to be presented at the morning session (Wednesday); also the afternoon session.

On motion, the Section then adjourned to 10 o'clock to-morrow morning.

SECOND SESSION—WEDNESDAY MORNING, SEPTEMBER 6, 1899.

Chairman Rusby called the Section to order at 10:45 a. m.

The Secretary read the minutes of the first session, which the Chair announced would, without objection, stand approved, and it was so ordered.

The Chair announced that the first order of business was the nomination of officers for the Section for the ensuing year. The names of Mr. F. G. Ryan for Chairman and Mr. C. A. Mayo for Secretary having been put in nomination at the first session, and no new nominations being made, on motion of Mr. Stevens the Chair was instructed to cast an affirmative ballot electing the gentlemen named as Chairman and Secretary, respectively. The Chair stated that the ballot had been cast as directed.

The Chair requested Dr. Reed to preside while the Committee on Chairman's address reported. Mr. Ryan, chairman, read the report, as follows:

REPORT OF COMMITTEE ON CHAIRMAN'S ADDRESS.

The committee appointed to consider the address of the Chairman of this Section is pleased to submit the following report:

The opinion expressed in the address, viz: "That work in the direction of liberal researches in the sciences allied to pharmacy is beneficial to the interests of this Section," is heartily approved. As the rule for restricting the time for the reading of papers to fifteen minutes may be suspended at any time by a vote of the Section, no change in this respect is thought necessary.

The suggestion that "the conditions governing the award of prizes be printed on the circulars of the Section" is approved.

The officers of the Section being at liberty to arrange the order of the reading of papers, it is not thought wise to formulate any special rule based upon the merits of the various papers presented.

The suggestion that separate sessions of this Section be held at the same time does not seem to your committee to be desirable at present.

Respectfully submitted,

H. M. WHELPLEY,
J. H. BEAL,
F. G. RYAN, *Chairman.*

DR. RUSBY: I would like to say, for the information of those present, that the chair-

man did not mean to suggest that the holding of different sessions of the Section at the same time should be authorized at present. He only suggested that as one of the ways to arrange the matter when the time should come when it would be necessary to do something of that sort.

DR. WHELPLEY: The report simply states that that time has not arrived.

MR. KREMERS: I think the Section should give due consideration to the suggestion of Dr. Rusby in regard to the discussion of papers. If we place this matter in the hands of a committee who know the character of a paper and the time necessary to present it, it seems to me that we will fare better in the long run than if the Section should arbitrarily set a limit upon the time for discussion without regard to the merits of the paper.

MR. RYAN: The fifteen-minute rule only applies to the reading of papers. It does not apply to the discussion of papers at all. The time for reading any paper may, at the pleasure of the Section, be extended.

DR. RUSBY: If I may be allowed to speak in favor of my own suggestion, I would say that the language of the by-laws is mandatory—that the Chairman is required by the by-laws to cut the reading of papers short after fifteen minutes have expired, and if the time is extended it must be done by vote of the Section in each particular case. We have seen many cases where the reading of a paper was stopped, utterly ruining the results. It seemed to me, therefore, that it was really necessary that a change should be made in regard to this, and that the Committee on Scientific Papers be authorized, in their discretion, to extend the time allowed to any paper, and not require a special vote of the Section.

MR. OLDBERG: There is another point in connection with this matter that ought not to be overlooked—another reason why Dr. Rusby's suggestion should be adopted. The whole Section together does not have an opportunity to see the papers, and knows nothing about them until read. The committee, consisting of the officers of the Section, see all the papers, and naturally are better qualified to pass upon their relative importance. Even assuming that all the papers are of equal merit, it still remains true that the nature of some papers is such that they had better not be read *in extenso*, whereas others would lose all their value unless read. So, therefore, the committee alone should decide whether a paper should be read that requires fifteen minutes or more to do so. Even if the reading should be extended to forty minutes the committee should have the power to have it read, if it is necessary, to get a proper understanding of it.

On motion of Mr. Oldberg, the fifteen-minute rule in question was rescinded.

On motion of Dr. Bartley, the report of the Committee as thus amended was then adopted.

MR. HALLBERG: I desire to file notice now that I shall assume my prerogative under the by-laws, and where a paper is presented to this Section requiring more than ten minutes to read I shall insist that an abstract of it shall be produced. I remember the hour and three quarters we had to listen to a paper at Old Point Comfort, and I made up my mind then, I would never be subjected to such an experience again.

Dr. Rusby resumed the chair.

The Chair announced that the report of the Research Committee was next in order, but that as Mr. Prescott had requested that the matter be postponed to the afternoon session, the reading and discussion of papers

would be the order, and asked Mr. Stevens to read a paper prepared by himself on some assays of wild-cherry bark. Mr. Stevens presented his paper in abstract, and gave some blackboard demonstrations of his subject. The full text of the paper was as follows:

WILD CHERRY BARK. DETERIORATION WITH AGE.

BY A. B. STEVENS, PH. C.

That wild-cherry bark deteriorates with age may be seen by comparing the results of the following analyses.

The time at which the estimations were made is placed above results.

The method of estimation is that given by the writer on page 216 of the American Pharmaceutical Association Proceedings for 1896.

The time of maceration may be reduced from 24 to 4 hours, and possibly even greater reduction may by made.

	Per cent. of HCN.	
Prunus serotina,	Assayed March 1898	March 1899.
Collected in May.		
No. 1. Bark from large branches	0.0675	0.0539
No. 2. Bark from large branches	0.1699	0.1486
No. 3. Refuse from grinding	Traces	None
No. 4. Bark from small branches	0.0458	0.0296
No. 5. Bark from small branches	0.0755	0.0702
No. 6. Refuse from grinding	0.0188	0.0027
Collected August 5, 1894.		
No. 7. Bark from large branches	0.062	0.027
No. 8. Bark from large branches	0.1025	0.0755
No. 9. Refuse from grinding	None	None
Collected November 29, 1895.		
No. 10. Bark from stems	0.0559	0.027
No. 11. Refuse from grinding	None	None
Prunus Virginiana.		
No. 12. Choke cherry bark	0.0539	0.0188
No. 13. Refuse from grinding	0.0216	None
Prunus serotina.	Assayed 1896.	1899.
No. 14. Bark from trunk	0.082	0.054
No. 15. Young green bark, powdered	0.102	0.027
No. 16. Same as 15, but not powdered until assayed	0.102	0.098
No. 17. Young green bark, powdered	0.089	0.062
No. 18. Same as 17, but not powdered until assayed	0.089	0.071
No. 19. Young bark, whole	0.0942	0.0814
No. 20. Young bark, whole	0.128	0.118

Samples numbered from 1 to 13 were collected by Dr. H. H. Rusby at Franklin, N. J., and very kindly presented to the writer. These samples were in pasteboard boxes. Others were in glass bottles.

From above results we may draw the following conclusions:

First, That the bark is best preserved in glass or air-tight containers.

Second, That the bark keeps better when permitted to remain whole than when powdered.

Third, That only whole, fresh bark should be used in the manufacture of galenical preparations.

The keeping qualities of the various preparations as compared with the bark will be a subject for further consideration.

I am indebted to E. D. Benjamin, Ph. C., for assistance in assay.

Mr. Alpers, seconded by Dr. Reed, moved the acceptance of the paper, to take the usual course. Carried.

At request of the Chair, Mr. Schlotterbeck presented two papers in abstract upon the structural development of the seeds of Gossypium Herbaceum and Theobroma Cacao, respectively.

DEVELOPMENTAL HISTORY OF IMPORTANT SEEDS.

A. VAN ZWALUWENBURG AND J. O. SCHLOTTERBECK.

I.

THE ANATOMY OF THE COTTON SEED AND THE DEVELOPMENT OF ITS SEED COATS.

That more exact and consistent terms descriptive of certain seed structures are desirable is, we believe, unquestioned. For example, we are accustomed to designate those seeds in which the embryo is enclosed in a copious nutrient tissue as albuminous, while in those cases where the embryo is comparatively large and constitutes the entire kernel, the seeds are said to be ex-albuminous. In the latter case the food supply, instead of surrounding the embryo, is contained within the fleshy cotyledons. The prefix "ex" in ex-albuminous is used in a privative sense, meaning without or not present. Accordingly, an ex-albuminous seed is without albumen. The text-books say that the albumen of seeds may be starch, fat, proteid, mucilage or reserve cellulose, and since we know that if this so-called albumen does not surround the embryo it is located in the cotyledons themselves, then the albumen must be ever present. In the seeds so far examined this has been demonstrated, hence the terms albuminous and ex-albuminous are not happy ones. Of course, all botanists know perfectly well what is meant by these terms, which have become convenient, but they are very confusing to the beginner.

Again, it is unfortunate that the term albumen, which is universally applied to and understood as a thick, viscous, nitrogenous substance, is given a double meaning by applying it to the tissue between the seed-coat and the embryo, and which may contain either starch, fat, proteid, mucilage or cellulose. To the chemist, the idea of albumen being anything but a proteid, is, to say the least, amusing. True, an attempt is sometimes made to make a distinction between albumen and albumin, but so far this has been unsuccessful.

Finally, the term albumen does not indicate in the least the source of the nutrient tissue surrounding the embryo, whether endosperm, perisperm or both. It may be said that examination of a ripe seed will only reveal the presence or absence of a nutrient tissue around the embryo,

and that neither endosperm nor perisperm possess characteristic features by which they may be identified in the ripe seed. This is only too true, and, therefore, it is only by studying the developmental history of seeds that such facts may be arrived at.

As a mere suggestion we offer the dropping of the word albumen entirely as now applied to seeds, and in its place use the more exact and descriptive terms endosperm, perisperm and endo-perisperm. A seed, then, whose embryo is enclosed in a copious nutrient tissue, will be called endospermous if that nutrient tissue be developed within the embryo sac. If the copious tissue surrounding the embryo be produced out of the tissue of the nucellus, then the seed would be called perispermous. A seed having both perisperm and endosperm would be called endo-perispermous, providing both take part in the formation of nutrient tissue surrounding the embryo. Since over 90 per cent. of the seeds possessing a nutrient layer are endospermous, there is practically no increase in number of terms in this substitution. Would it not be more definite and descriptive to say, for example, that the castor-oil seed is endospermous and the caraway endo-perispermous?

We might point out the great confusion which has resulted from the indiscrimininate use of the terms *testa* (episperm, exopleura), and *tegmen* (endopleura) as applied to the seed-coats, but enough has been said along this line to show the importance of extended work on the development of seeds.

That this work is very profitable as well as extremely interesting has been shown by the researches of Harz, Nobbe, Tschirch, Guignard, Lohde and others. It has been shown that many features, valuable for classification, may be found in the developmental history as well as in the anatomical structure of seeds. Thus, one of us * found that at a certain period in the life-history of the seeds of Croton Tiglium, Croton monanthogynus and Croton capitatus, the nucellus protudes through the micropyle beyond both integuments, apparently growing out to meet the pollen tube and thus ensuring positive fertilization. Evidently, a circumstance so extraordinary, that if found to occur in several doubtful species or related genera, would prove to be of great value in determining the proper position in a system of classification.

As a small contribution to this interesting and broad field of pharmacognosticalre search, the development of the seed of Gossypium herbaceum and Theobroma Cacao is offered. The work was done in the pharmacognostical laboratory of the University of Michigan, and under the provision of the Stearns Fellowship.

The seeds of Gossypium herbaceum are found embedded in the mass of snow-white fibres which are exposed to view when the three to five-celled

* Inaug. Dissert., J. O. Schlotterbeck, Bern, 1896.

fruit dehisces. Each loculus of the fruit usually contains five or six full-grown seeds, besides one or more aborted ones.

The anatomy of the seed has been worked out with considerable care by von Bretfeld.* He corrects several errors in the work of Berg, Wiesner, and Hartz, in previous descriptions of this important seed. He did not, however, devote any attention to the development of the seed.

The seed-coats proper may be divided into five layers or zones, three of which are developed from the outer integument of the ovule, and two from the inner integument. To these may be added another layer, a membrane situated between the true seed coats and the cotyledons, and easily separated from them. This layer von Bretfeld does not class with the seed coats, since it is not developed from any part of the integuments. From conclusions based upon a study of other Malvaceæ by Lohde, von Bretfeld assumes that this layer is what remains of the nucellus and endosperm after the seed has reached its maturity. After continued study on all available stages in the growth of the ovule, we have been led to believe that this layer includes, beside the obliterated nucellus and the endosperm, the inner epidermis of the inner integument.

The outer epidermis of the outer integument is composed of a single layer of cells, some of which are enormously lengthened radially, and whose walls are uniformly thickened. These are of two kinds. Some, often 4 Cm. in length, are easily removed from the seed, and constitute the cotton of the market. The other variety (Grundwolle) of epidermal hairs, is much shorter, slightly yellowish in color, and thickly cover the seed even after it has been ginned. The insertion of these two kinds of hairs is the same. Not all of the epidermal cells form hairs, the greater number of them being flattened and developed tangentially into larger thick-walled, angular forms, crowding the trichomes so as to almost obliterate the cell-lumen at the point of attachment. These large angular cells are filled with dark masses of phlobaphene or oxidized tannins, and are arranged about the trichomes in an orderly manner. (Fig. 13) (Fig. 10_2.)

Following this is the outer pigment layer composed of two to several layers of thin-walled cells filled with phlobaphene. These cells are collapsed tangentially to a dark zone, and are stratified into plates. This layer contains numerous fibro-vascular bundles, and gives a strong reaction for tannin with ferric chlorid. (Fig. 10_2.)

The third layer, immediately below this (Fig. 10_3), is the colorless layer composed of one or rarely two rows of empty cells giving a rose color with phloroglucin and hydrochloric acid. These three layers comprise the outer integument of the seed-coat proper. (Fig. 10, oi.)

The next layer is developed from the outer epidermis layer of the inner integument of the ovule, and constitutes the protective layer of the seed.

* Jour. f. Landwirtschaft, Vol. I., pp. 29–56, 1887.

This protective layer is composed of palisade cells and adheres closely to the colorless layer above described. This most interesting structure is a curious development of cell tissue. It is composed of one row of cells enormously developed radially, with walls so thickened as to almost completely fill the cell lumen. (Fig. 10_4). Each individual cell forms a prism with outlines almost mathematically exact. A somewhat idealized sketch is shown in Fig. 11. The walls of these palisades are not uniform throughout their substance, and after treatment with Schultz's solution show numerous striæ running longitudinally. (Fig. 12.) This difference in density of refracting power is also visible in ordinary sections more plainly with the polariscope with partly crossed Nicoll prisms. (Figs. 14, 15, 16.)

The lumen is contracted about a small mass of dark material which resists all ordinary reagents and is situated about a third of the length of the cell from the outer end of the prism (Fig. 10, lm). From this point outward the cavity contracts to almost a line near the outer end, while downward it is completely filled. In tangential section this cavity appears branched or stellate in outline, following the angles of the prism (Figs. 14–15.) Where the cavity has entirely disappeared this radial structure is still visible (Fig. 16), and causes the appearance of the striæ seen in radial section. This effect is probably due to a difference in quality and density of the wall-substance which is laid down in layers. With phloroglucin and hydrochloric acid the outer part, only, of this solid portion is colored red, while the part of the cell wall immediately about the lumen, except at its outer and inner ends, remains unaffected. With polarized light, radial sections of this row of cells present many pretty and curious effects of brightly colored zones or bands, the colors depending upon the angle between the prisms. Near the outer end of these cells there is a so-called "Lichtlinie" common to many seeds having a palisade layer in the seed-coat. It is a line of more refractive material running through the palisade tissue. This curious phenomenon has been explained in many ways, none of which appears entirely satisfactory. Von Bretfeld and Lohde consider it the effect of a cuticularization of the cell walls.

Below this palisade layer is the second pigment layer (Fig. 10_5). It is made up of the greater part of the inner integument more or less collapsed, and in its outer portion is filled with phlobaphene. The cells of this layer are not so completely obliterated as those of the outer pigment layer, and in tangential section the tissue is of the nature of typical stellate parenchyma with very large inter-cellular spaces. Following this is the easily separable membrane mentioned as being composed of the obliterated nucellus and endosperm, and the inner epidermis of the inner integument. The cells of the outer row of this membrane have walls thickened in a very irregular manner, rendering the outlines of the cells wavy and very indistinct (Fig. $10_{6,7,8}$).

The cotton seed has very little endosperm; usually one row of cells except where the cotyledons are less tightly pressed against the seed-coats, as at the folds and at the raphe end of the seed. It is composed of regular thick-walled cells somewhat extended tangentially, and contains fat. The embryo carries its own food supply and does not depend upon an endosperm or perisperm for nourishment.

The cotyledons are irregularly folded about the radical in a very characteristic manner, and are heavily loaded with fat. Imbedded in the mesophyl of the seed leaf are numerous glands the exact nature of which still remains to be determined. These are filled with a pigment giving a permanent rose color with phloroglucin and hydrochloric acid. This pigment passes into solution in the oil during expression.

The ovules of Gossypium herbaceum are anatropous and possess two integuments. In the youngest stage the ovule is merely a papillary extension of the placenta wall with no differentiation whatever into integuments or nucellus (Fig. 1). In Fig. 2 we note the beginning of the formation of integuments in rings or ridges about the end of the papilla. In the stages immediately following (Fig. 3), the integuments rapidly develop, the outer one outstripping the inner one until the nucellus is entirely enclosed, leaving a micropyle at the tip.

From this stage until about the time of flowering no particular change is observed except a gradual enlarging of all the parts of the ovule. At about the time of flowering, however, the epidermis of the outer integument begins to differ from the layer of even cells which it has up to this time been. (Fig. 4.) Some of the cells become more convex than others and soon lengthen out to several times the length of those about them. This is the beginning of the trichome formation. (Fig. 5.) These hairs continue to grow rapidly in length until the seed is nearly ripe, when the walls increase in thickness to form the well-known cotton fibre.

The remainder of the outer integument increases in thickness until it contains as many as ten or twelve rows of cells, and develops numerous fibro-vascular bundles. The cells accumulate starch, which is later reabsorbed or employed as material for the nurture of the epidermal hairs and the formation of the dark cell-content of the outer pigment layer. The inner epidermis of the outer integument changes but little to form the colorless layer. (Fig. 10_3.)

In the inner integument there is no apparent change for some time after flowering beyond an increase in the number and size of the cells and their loading with starch. When the seed is about half grown the cells of the outer epidermis of the inner integument begin to lengthen radially; (Fig. 7_4) this continues until their length is about twelve times as great as their diameter. For the development of these cells and the thickening of their walls the starch in the tissue (Nährschicht) below them is consumed and the latter tissue becomes darkened and collapsed. The inner

epidermis of this integument develops curiously thickened walls. (Fig. 10_6.)

After fertilization, the nucellus is rapidly pushed aside by the growing endosperm and embryo and almost completely absorbed. It is obliterated to a thin layer of nigh structureless material between the inner epidermis of the inner integument and the endosperm. (Fig. 10_7.)

The endosperm is almost entirely consumed in the nourishment of the embryo, and remains behind in the ripe seed as a zone of one to five rows of cells. (Fig. 10, end.)

In this seed the outer epidermis of both integuments undergoes extraordinary development; that of the outer integument to form cotton-fibre and that of the inner integument to form the protective layer or the so-called testa. This latter case is analogous to that of the seed of Ricinus communis, in which the protective coat is also developed from the outer epidermis of the inner integument.

DESCRIPTION OF PLATE.

es–embryo sac. ii–inner integument. oi–outer integument. nuc–nucellus. fun–funiculus. ra–raphe. lm–lumen. st–starch. cf–cotton fiber. ll–Lichtlinie. ep–epidermis. end–endosperm.

Fig. 1. Youngest stage of ovule.

Fig. 2. Young ovule beginning to differentiate integuments.

Fig. 3. Full-grown ovule about the time of fertilization.

Figs. 4–10. Cross sections of integuments during successive stages of growth.

Fig. 11. Ideal drawing of palisade cell.

Fig. 12. Palisade cell isolated with Schultz's maceration.

Fig. 13. Tangential view of the epidermal cells of the outer integument.

Figs. 14–15. Tangential section through the palisade zone, showing the cells in cross section.

Fig. 16. Similar sections through palisade zone nearly two-thirds the way down the prism.

Fig. 17. Surface section of inner epidermis of inner integument.

II.

A STUDY OF THE DEVELOPMENT OF THE SEED OF THEOBROMA CACAO.

The large fruit (Figs. 6, 7) of the cacao tree is developed from relatively very small flowers (Fig. 1), which are borne in clusters upon the trunk and larger branches. For this reason the cacao is classed with the Cauliflorae.

The fruits are also few in number compared with the abundant blossoms, and grow enormously without much change in form. (Figs. 3–7).

The calyx persists for some time after the flower proper has given place to the expanding ovary, and the ridges and furrows visible in the pistil are preserved, with some modification, in the fully grown fruit

From 40 to 60 seeds are embedded in the fleshy, succulent interior of the fruit. This pulpy interior is made up of thin-walled parenchyma interspersed with mucilage cells or cavities which are identical with those of the

Gossypium herbaceum

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

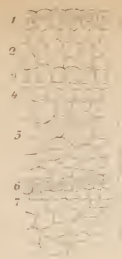


Fig. 5.

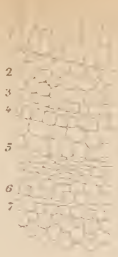


Fig. 6

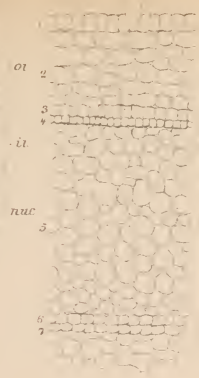


Fig. 11.

Fig. 12

Fig. 7.

Fig. 8.

Fig. 9.

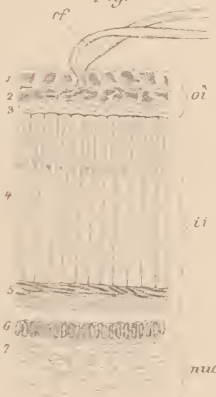


Fig. 10.

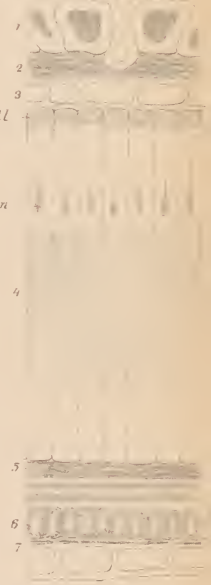


Fig. 17.

Fig. 16.

Fig. 13.

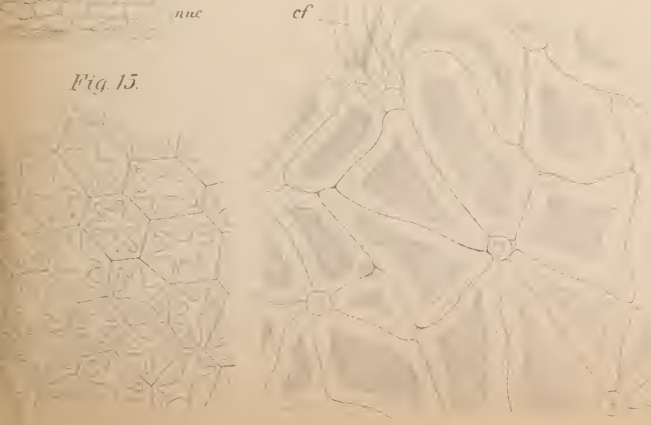
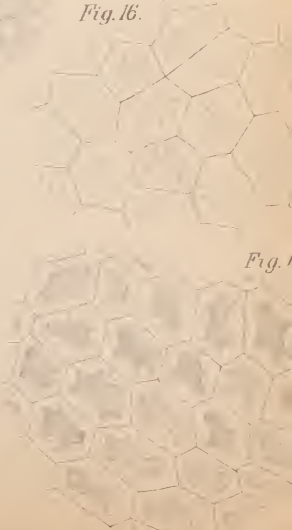


Fig. 15.

Fig. 14



seed-coat (Fig. 15, nuc.), and apparently serves as nourishment for the seeds in the final stages of ripening. The parenchyma gradually changes into a filamentous-like, spongy tissue, with large air-spaces, and in the fully ripe pod is shrunken and obliterated. A part of this tissue persists and adheres to the seed-coat and gives a ragged and fibrous appearance to the cacao seeds of commerce.

The anatomy of the seed has been fully described and figured by Tschirch (Arch. der Pharm., 25, p. 605), in his Atlas. A cross section of the dry seed coat (Fig. 15) shows a mass of obliterated tissue, in which the large cavities filled with mucilage are conspicuous. The outer layer is usually composed of more or less fruit pulp, then follows the inner epidermis of the pericarp wall, which is composed of long narrow cells stretched diagonally across the cells of the outer epidermis of the seed-coat proper.

The outer epidermis of the seed-coat is composed of large angular cells with outer and side walls thickened, while the inner wall is similar to the thin, half-dissolved walls of the mucilage cells immediately below. These cells or cavities (Fig. 15) are formed by the fusion of several others, are very large, oval, and separated from each other by small strands of radially compressed, and largely obliterated tissue. Parts of the walls of the cells from which these cavities are formed, remain as thin radial septa stretched and often ruptured. The contents of these cavities is an almost colorless mucilage which swells when treated with water, and renders the surface of the seeds slimy and sticky to the touch when moistened. It is not uncommon to notice a stratification in this mucilage, especially when it is caused to swell slowly. (Figs. 14, 15.)

Bordering and below these cavities is a layer of thin-walled parenchyma, very loose, with large intercellular spaces. In the dry, ripe seed the tissue of this layer is compressed and distorted, thus making it difficult to recognize the character of the cells without swelling them first in water or very dilute alcohol. Very conspicuous in this layer are the fibro-vascular bundles (Figs. 15 fb), which are abundant over all parts of the seed. These are composed of very small elements not easily distinguished; occasional crystals of calcium oxalate scattered irregularly through the tissue are an inconspicuous feature of this layer.

Below this layer is the sclereid zone, which is composed of one row of comparatively small cells, thickened along the side and inner walls only (Fig. 15 scl). This layer of sclerenchyma is interrupted by openings filled with angular parenchyma. Below this is another layer of flattened and crushed parenchyma composed of many thin-walled cells. This is followed by a layer of very regular angular cells filled with masses of fat. This is the epidermis of the thin membrane easily separating from the kernel and shell and called by Tschirch in his earlier work the endosperm. From the study of the development of the seed which we have made we have come to the conclusion that it is the nucellus and not the endosperm.

This membrane, the remains of the nucellus, is a mass of compressed and mostly empty cells, and follows the surface of the cotyledons into all their folds and crevices. At the point of separation of the cotyledons where a little angular space remains the cells are better defined and sometimes contain crystalline matter.

The epidermis of the cotyledons is composed of a regular row of cells filled with fat and dark-colored material and bears multicellular hair-like structures called Mitscherlich's bodies. (Fig. 16 Mb.) They are not easily observed since they break off by any lateral movement or friction between the shell and kernel. Within the folds, however, and especially about the radicle, they are readily found *in situ*. Some cells of this layer may be seen from which the outer wall has been broken, having adhered to the hairs when they were rubbed off.

The body of the cotyledons is composed of thick-walled hexagonal cells filled with fat, aleurone and starch. Here and there near the surface are elongated cellular elements filled with pigment material which is darker in the cells near the surface. Strands of conductive tissue will also be seen in the interior of the cotyledons.

The study of the development of the ovule was attended with unusual difficulties. The material was in alcohol, very dark in color, and did not represent all of the stages of growth. The younger ovules are extremely small, and their tissue is composed of elements which may be called minute, and so darkly colored with oxidized tannins as to render them opaque in ordinary sections.

The ovules are anatropic and arranged in irregular longitudinal rows in the ovary, their major axis nearly vertical to that of the ovary, with ends alternately to the right and left vertical to the radii of the cross sections of the ovary.

The ovule has two integuments, and in its younger stages is somewhat angular; in longitudinal section somewhat triangular, with one angle at the micropylar end. As it expands in bulk, however, it soon assumes a regular oval form (Figs. 10, 12) which it preserves throughout its development until it is again somewhat distorted by compression and drying in the hard, shrivelled fruit. The ovule is very slow to differentiate, apparently continuing its growth in size only until nearly full-sized. Not until the embryo begins its rapid expansion do the tissues begin to assume their distinct characters.

Throughout the entire development the outer integument is composed of very fleshy tissue. Its outer epidermis continues a row of regular thin-walled cells until the seed is nearly ripe, when the outer and side walls rapidly thicken and assume their final form. The tissue immediately below is at first composed of small angular cells; these gradually expand into loose parenchyma filled with starch and contain numerous strands of conducting tissue. When the seed has attained about one-fourth of

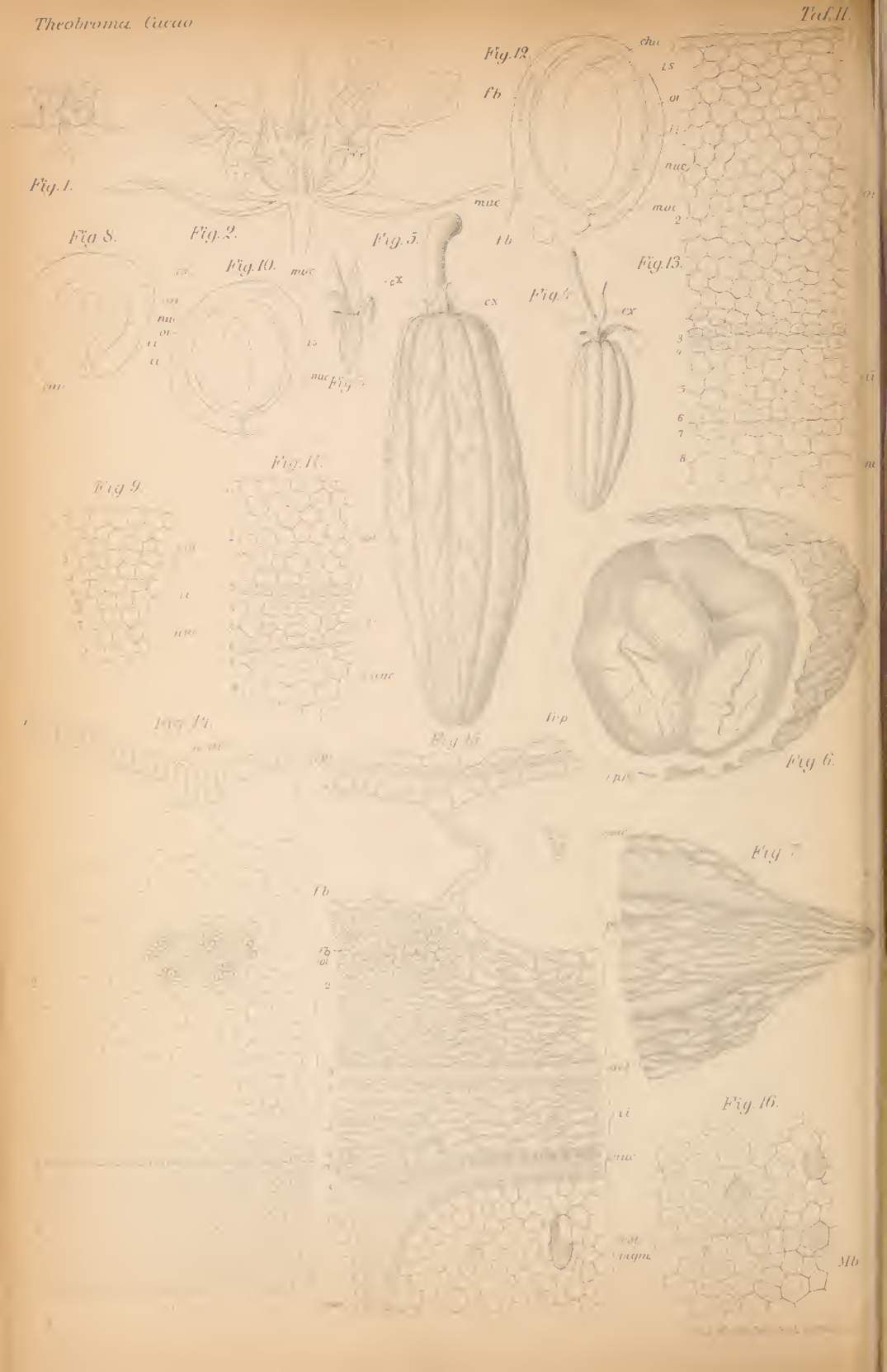


Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
Fig. 15.
Fig. 16.
fb
cx
mac
Mb

its full size the mucilage cavities which are at all times plentiful in the fruit pulp begin to make their appearance in this tissue; at the base of the ovule being developed from cells near the outer epidermis.

The lower lying parenchyma, in the later stages of growth, form stellate parenchyma, and enclose an occasional crystal of calcium oxalate. During the ripening of the seed when the inner epidermis develops into sclerenchyma and the embryo fills the seed, this layer loses it starch, and its cells become crowded out of all semblance to their former shape.

The inner epidermis of the outer integument remains a row of thin-walled cells until near the end, when the inner and side walls thicken, and the characteristic sclereid layer is formed (Fig. 15 scl.)

There is no differentiation of the inner integument into any striking structure. It grows in thickness, is at all times fleshy, and gathers starch which it finally gives up to the surrounding tissues. It then collapses into the irregular mass which is its final form.

The nucellus apparently keeps pace in growth with the integuments, and is composed of very delicate thin-walled tissue, denser in its outer portion and more and more delicate toward the center of the ovule. In the center of the large ovule it is no longer possible to distinguish the cell walls, and what appears to be a cavity filled with liquid occupies a considerable space. From this time on the young embryo is easily removed from section of the ovule, either by shaking with water or by teasing with a needle. This is probably due to the contracting effect of the alcohol in which the material was preserved.

Very little change takes place in the epidermis of the nucellus until the embryo has attained considerable size, when the walls thicken and it acquires its final contents.

The embryo is inconspicuous until the ovule has nearly reached its mature size when it rapidly expands, and by absorbing and crowding the surrounding tissue finally forms nearly the entire bulk of the seed.

DESCRIPTION OF PLATE.

cx–calyx. fb–fibro-vascular bundle. muc–mucilage. nuc–nucellus. oi–outer integument. ii–inner integument. es–embryo sac. cha–chalaza. fun–funiculus. ep–epidermis. frp–fruit pulp. ep. fr–inner epidermis of fruit. scl–sclereid. cot–cotyledon. pigm–pigment cell. Mb–Mitscherlich's body.

Fig. 1. Flower natural size.

Fig. 2. Flower enlarged, cut longitudinally.

Figs. 3–5. Young fruits natural size.

Figs. 6, 7. Mature fruit in sections.

Figs. 8, 9. Young ovule and cross section of integuments.

Figs. 10, 11. Older stage of ovule and cross sections of integuments.

Figs. 12, 13. Still older stage of ovule with cross section of integuments.

Fig. 14. Cross section of nearly mature seed coat.

Fig. 15. Cross section of mature seed coats.

Fig. 16. Tangential section of cotyledon showing Mitscherlich's body.

We take this opportunity of thanking Director Hart, of the Trinidad Botanical Garden, for his great kindness in collecting and forwarding the material upon which this research was conducted.

The Chair stated that, without objection, the papers just read would be accepted, and it was so ordered.

THE CHAIR: We shall now proceed to the reading of a group of papers bearing on the same subject, and, if you will allow the chairman, I will have the three papers read before any discussion.

Mr. Kraemer then presented in abstract his paper on Color Standards of Powdered Vegetable Drugs, exhibiting a series of color-plates illustrative of his subject. The full text of his paper is given below.

COLOR STANDARDS OF POWDERED VEGETABLE DRUGS.

BY HENRY KRAEMER.

In endeavoring to present a paper which will in some measure contribute to the solution of the question, "Is it practicable to provide an illustrated set of color standards of the vegetable drugs of the United States Pharmacopæia?" I have, at the suggestion of the Chairman of the Section on Scientific Papers, taken up the study of the colors of powdered vegetable drugs. This class was selected because it seemed more likely that from them than from the crude drugs a set of color standards might be formed. Inasmuch as there has been so much work done on the origin and nature of colors by physicists and in the examination of the various coloring principles in animals and plants, as well as inorganic substances, by biologists and chemists, it was thought that this paper would be more valuable with such a general consideration of the subject as would answer the numerous questions that would naturally suggest themselves in its more or less comprehensive study.

I. GENERAL CONSIDERATION.

There is probably no other property or characteristic which is so much associated by the popular mind with nearly everything as color. Some of the most interesting systems of classification of animals, plants and minerals, from an arbitrary standpoint, are those based on color, and yet nothing is so deceiving in some instances as these artificial systems. Thus, while they may be interesting and helpful in one way, they lose their value for other purposes because color is dependent upon many different conditions, and varies accordingly. Color is not only associated with what is appreciated by the eye, but with the impressions received through the sense of hearing. Certain names are associated with colors and certain voices are likened to colors. An eminent psychologist (Claparède of Genoa) states that of 407 persons examined by him 205 possessed the faculty of color-hearing. Color is also associated by some persons with

impressions received through the sense of touch and also with the perception of motion.

The color in plants and animals is dependent upon physical as well as physiological conditions. In minerals, on the other hand, where vital force is considered to be absent, the physiological influences are replaced by chemical interactions. Inasmuch as nothing is entirely free from alteration by reason of physical, chemical or physiological influences, we expect continual (either rapid or gradual) changes in the physical or chemical composition of all bodies (be they animate or inanimate), and as a result changes of color are also produced. In addition to the personal element, this is another reason why the color of few substances is the same to different persons, or even the same persons at different periods of time. This complexity of perception arises from the fact that with us changes of a psychological and physical character are continually taking place; while in the case of colors their appreciation is not only dependent upon our varying degrees of perception, but their character is influenced by the various changes taking place in the substances by which they are produced. Color may be likened to revelations of the mind. For example, no two persons see exactly the same revelations and even the revelations at one time may not be appreciated or comprehended by the same person at another time. This again may be attributed to the fact that with us, as with color substances, changes are continually taking place in our own organization (nerves, etc.).

We note, during the life of the plant, as well as after death, that changes in color are continually taking place. In some cases, of course, these changes are more rapid than in others. These changes, in some instances, are based upon certain natural physiological conditions, and at other times are induced by diseased or pathological conditions. Heat, light, air and food (or chemical substances which may be in the nature of food or poison) as well as the presence or absence of the influence of a parasite or saprophyte guest—all influence the plant in its vital processes, as is shown generally by the nature of the coloration.

It is well known that germinating plants and growing flowers and fruits require for the production of their natural colors the action of light. The coloring substance in other plants is not so much affected by the light as by the presence or absence of air (oxygen) as, for example, those containing carotin, indican, tannins, etc. The various natural colors in plants and animals are affected by certain chemicals, as ammonia, sulphurous acid, hydrochloric acid, potassium cyanide, etc. It is generally conceded (though still disputed by some) that colors in plants, as the blue in flowers of Hydrangea, are dependent upon the presence of certain chemicals, as iron or aluminum sulphate in the soil. These salts when taken up by the plant produce combinations with the anthocyanin in the flowers, giving a blue color.

Furthermore, many colored substances, as the green in the leaf, are a mixture of a number of substances, and these in different proportions give shades varying from green to yellow, as observed in the leaves of the same plant during the spring, summer and fall. It is interesting, too, in this connection, to mention that plants which produce a rich green in shaded places develop a yellowish pigment when growing in full sunlight, and also that flax when growing at heights of 2000 metres assumes an etiolated condition. Furthermore, in hybrids there is apparently a fusion of the pigments of the parents, so that intermediate colors are produced.

II. ORIGIN AND NATURE OF COLOR.

From these few general considerations of the question of color, particularly in plants, it will be seen that it is a question of not only great interest, but one that requires for its elucidation a rather broad comprehension of the subject in all its relations. Much work has been done, and much has been written upon the subject by physicists, chemists and biologists in general, but nearly every one has hesitated to bring the whole together, because there is so much work connected with it. I have ventured, however, to bring a part of the whole together, hoping that it may serve as a nucleus either for further work on my part, or for that of others in this direction. I propose, therefore, first of all to treat of the subject of colors generally from a physical standpoint.

Color is defined objectively by the physicist, and is considered to be dependent upon vibrations produced by any object or substance that can send out radiant energy and set the luminiferous ether in rotation. The kind of color produced is dependent upon the waves of vibration. When the waves vibrate at their minimum velocity the sensation of red is produced; when they vibrate at their maximum velocity, the color known as violet is produced. In between these extremes of vibration other colors are produced. We know that the ordinary light of the sun is made up of a mixture of short and long ether waves which constitute the spectrum. A body which reflects all of these ether waves we say is white; one which absorbs all of them is considered black; and one which absorbs all others but red (which it reflects), is spoken of as being red in color. This means that color, as such, is dependent upon physical conditions, which may be easily demonstrated in the physical laboratory.

Mr. Ackroyd has published (Chem. News, 1893, lxvii., p. 27), what he considers to be the law of color. Briefly stated, it is as follows: In a series of molecules with a constant weight radical R, and a variable weight radical R', the color varies in a definite order; increase of weight or number of the variable radical R' causes changes toward the black end of the metachromatic scale. The scale which he has proposed has the colors ranging in order, as follows: white, blue, green, yellow, orange, red, brown, black. The same author finds that the change of color from white

through the metachromatic scale is correlated with increase of molecular volume. The following examples may be mentioned:

Substance.	Molecular Volume.	Color.
HgO	19.5	red
Hg_2O	43.4	black
Bi_2O_3	56.7	yellow
Bi_2O_5	84.1	brown
$CuSO_4$	44.	white
$CuSO_45H_2O$	113.	blue
$PtCl_2$	45.3	green
$PtCl_48H_2O$	196.7	yellow
MgO	11.8	white
ZnO	14.8	white to yellow
CdO	15.6	red to brown
HgO	19.5	red
ZnS	24.8	white
CdS	31.9	yellow
HgS	30.0	white to black

From the comparative examination of numerous elements and compounds, Ackroyd proposes the law "that increase of absorption of light in the order of the metachromatic scale is accompanied by increase of molecular and atomic volume."

Armstrong has studied (Ibid, 1893, p. 143, 153, vol. lxviii., p. 255, etc.) the relationship between the molecules and the optical properties of different substances, from which it appears that colored substances are quinonoid compounds, *i. e.* a hexaphene (being an unsaturated cycloid composed of six elements) two elements of which are C⊃R″ groups in either the ortho- or para- positions.

A few years ago Carey Lea published (Ibid, 1896, p. 48, 260) the results of some interesting studies on the relationship of colors to atoms, ions and molecules. He considers that "the color of the elementary atoms is, broadly speaking, a function of the atomic weights," and draws the following conclusions:

1. The atoms with atomic weights between 1–47 are colorless: 52–59 colored; 65–90 colorless; 103–106 colored; 112–139 colorless; 145–169 colored; 192–196 colorless. Elements which fall between these groups have both colorless and colored atoms.

2. When highly-colored inorganic substances are composed of colorless ions, if these substances can be brought into solution the color wholly disappears. It is proved that the ions have become so far separated that they no longer influence each other's vibration periods, e. g,; antimony pentasulphide is an intensely colored substance which dissolves easily in solutions of alkaline sulphide, forming colorless solutions, because the ions of antimony and sulphur are colorless, and in the act of solution they separate sufficiently so as to no longer change each other's vibration periods, without, however, passing out of each other's spheres of influence.

3. The union of ions, colored and colorless, gives rise to the most surprising changes of color. Two similarly colored ions may unite and form either a colored or colorless element. No black ion is known, and there is absolutely no relation traceable between the color of an ion and that of the compounds which it forms.

4. Selective absorption of the visual rays by an element can never constitute a basis for classification, but the relation of ions to the visual rays leads to a classification which is in absolute harmony with the chemical characteristics of the elements.

5. Ions, when in solution, are separated from each other, and no longer affect each other's vibrations, but they are in no sense *i. e.* out of the range of each other's influence.

PERCEPTION OF COLOR.

The perception of color has been explained by the physical theories of Young and Helmholtz. According to these investigators, it appears that the perception of colors is due to the fact "that each fibre of the optic nerve that enters into a cone of the retina is composed of three fibrils, one of which is strongly excited by red and but little by green and violet; the second is strongly excited by the green and little by the red and violet; and lastly the third is strongly excited by the violet and little by red and green." G. Darzens has recently (Chem. News, Aug. 30, 1895, p. 103), shown why light having a wave-length of 0.620 per cent. strongly excites one of these fibres and has scarcely any effect upon the other two.

COLOR PHOTOMETRY.

Any standard which may be adopted for practical needs must be more or less empirical, arbitrary and variable, but I deem it desirable to call attention to the fact that by means of "color photometry" scientific results may be had which are of practical value. Mr. Abney describes (Chem. News, 1891, vol. 64, p. 295) methods for obtaining a standard scale, and gives the method for ascertaining the color number of an unknown body compared with this scale.

CLASSIFICATION OF COLORS.

Colors may be grouped, according to Ed. B. Poulton (The Colours of Animals, 1890), into (1) Pigmentary and (2) Structural.

The first class includes those substances which absorb certain rays, and the effects vary with the chemical nature of the substance (pigment). The structural colors are those produced rather by the structure of the substance than by any chemical composition. The colors of this group may be classified as follows:

(*a*) *Colors due to diffraction.* "When a ray of white light falls upon a surface with fine parallel grooves the reflected light is colored—the colors varying with the angle at which the light falls on the surface and the angle

at which it is seen." It is supposed that the iridescent colors of the inner surface of some shells (as mother-of-pearl) are probably caused by diffraction.

(*b*) *Colors due to refraction*, viz., the prismatic colors produced when a ray of white light passes through a prism. It is supposed that the metallic colors of the feathers of some birds and the scales on the wing cases of certain insects are caused in this manner.

(*c*) *Colors due to interference.* In a soap-bubble we have a plate of liquid surrounding a sphere of air. The rays of light which strike the upper surface are partly reflected and partly absorbed. Those absorbed pass to the under side and part pass through while part are reflected, and these interfere with those coming through from the upper side as well as from the outer surface. Those rays which are not neutralized or destroyed are observed as colors—the relative cross length determining the color. Interference colors in animals are due either to (1) films of air between rather horny layers, as the iridescent colors of wings of beetles, or (2) films of liquid between dense laminæ, as the metallic colors of many chrysalides (*e. g.* Vanessa). One observer found that a brilliantly gold beetle lost all its lustre after hibernating in captivity, but entirely regained it after drinking some water.

Pigments are distinguished from dyes by their difference in solubility. The former substances are coloring matters that are insoluble, whereas dyes are those that are soluble. A dye (as cochineal solution), may become a pigment (as carmine) when in an insoluble powder.

Colors are distinguished from coloration in that colors are the actual tints (blue, green, red, etc.), which are found in animals or plants, whereas by coloration is meant the arrangement of these tints or patterns.

Hue is synonymous with color. Tint is a hue or color modified by white. Shade is a color darkened with black.

"It is an axiom of chromatologists that the multitudinous hues, shades and tints of nature are simply the results of various combinations of three primary colors, together with the 2 additional elements of absorption and refraction; making 5 elements in all, from which it, of course follows, as a mathematical deduction, that 120 combinations, *i. e.*, specific colors (using the latter term in the comprehensive sense), are possible. Additional modifications almost *ad infinitum* are produced by varying circumstances, as different relative proportions of the component elements, effects of contrast, etc. Accepting this theory as correct, it would, therefore, seem that in order to reproduce from Nature any color, tint or shade, whatsoever, that might be desired, the artist would require only 3 pigments to represent the primary colors, *i. e.*, a red, a yellow and a blue; together with black and white, the two latter to represent the elements of absorption and refraction of the sun's rays, or darkness and light, respectively. Such would really be the case, and the manipulation of colors, therefore, a very simple

process, were we able to get pigments representing absolutely pure primary colors. Unfortunately, however, the artist's palette does not yet contain even one of them in its requisite purity, neither do the black and white pigments represent satisfactorily the elements of darkness and light. Therefore, it becomes necessary in order to obtain certain desired results to make a combination of pigments different from that of the solar spectrum, as for example, the substitution of yellow for green."

It might not seem with this statement that the matter of production of exact shades would be difficult. It is well known, however, that the pure hues of the spectrum have not been permanently produced. The aniline reds and purples are of a purity and richness not approached by any of the natural colors (as madder, cochineal), but they are not permanent. "Genuine ultramarine is said to be the most perfect known of pigments, and the same may be said of the lighter cadmium yellows, so that the great desideratum is a perfect red. Among trustworthy pigments, vermilion, Paris green and ultramarine are named by von Bezold as those which most nearly represent the primary colors." It is generally recognized that durable and satisfactory yellows, blues and greens may be obtained, but it is conceded that a perfect red is not yet obtained, the objection to the aniline colors being that they fade, "the reds of iron (Venetian red, light red, etc.) are too dull, the madder preparations are too weak," and vermilion will make neither a pure orange with yellow nor a purple with any blue.

The various hues, shades and tints for use in representing the colors of animals and plants have been furnished us in a series of 50 colored illustrations by P. A. Saccardo.[1] Ridgway[2] has also published a series of 9 plates containing on each about 20 colored figures to illustrate the coloration in birds. This plan of Ridgway is followed by other writers on ornithology, as Chapman,[3] who gives a plate of 30 colors which he calls his "mental palette." It is not supposed, as he says, when, for instance, the feathers of a bird are described as being "grayish brown," that they will correspond exactly to the colors of the plate, but they are nearer to this color than to any other in the plate. He very wisely further says of the plate that "used even in this general way, the plate will prove a far more definite basis for description than if every one were left to form his own idea of the colors named."

NOMENCLATURE OF COLORS.

Every naturalist, and we might add scientific person, as well as commercial analyst, appreciates the necessity for not only standards of color, but also a standard system of nomenclature. The first book written upon this subject was "Werner's Nomenclature of Color." According to Ridg-

[1] Chromotaxia seu Nomenclator Colorum polyglottus additis speciminibus coloratis ad usum Botanicorum et Zoölogorum. 1891.

[2] Loc. cit.

[3] Hand-book of Birds of Northeastern North America. By Frank M. Chapman, 1895

way[1] the colors in Syme's edition of Werner's Nomenclature had changed considerably up to the time of writing his book.

The question of nomenclature in colors is becoming more and more confusing with the introduction of newer synthetic aniline colors. With these have come a large number of names without any significance whatever, as "elephant's breath," "baby blue," "bright green," etc.

Various systems of classification of colors have been proposed by different writers, notably those by Von Bezold[1] and Ridgway.[2] The classification of the latter is as follows:

I. PURE COLORS OF THE SOLAR SPECTRUM.

(*a*) PRIMARY COLORS, or those not produced by mixture.

1. Red.
2. Yellow.[3]
3. Blue.

(*b*) SECONDARY COLORS, or those produced by the mixture of two primary colors.[4]

4. Orange (= red and yellow).
5. Green (= yellow and blue).
6. Purple (= blue and red).

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[1] Theory of color.

[2] A nomenclature of colors. 1886.

[3] Yellow was formerly considered to be a primary color, but later investigations lead to the conclusion that green must be substituted for yellow. From the standpoint of the artist, however, yellow is to all appearances and intents regarded as a primary color.

[4] Secondary colors grade insensibly into the two primaries composing them, so that there results an unbroken transition from one end of the series to the other. The transitions may be shown by the following sequence, the names of the primary colors being given in heavy faced type and those of the secondary colors in italics.

SPECIMEN SERIES.

I. 1. **Red.**
2. *Orange-red.*
3. *Reddish-orange.*
4. *Orange.*
5. *Yellowish-orange.*
6. *Orange-yellow.*

II. 7. **Yellow.**
8. *Greenish-yellow.*
9. *Yellowish-green.*
10. *Green.*
11. *Bluish-green.*
12. *Greenish-blue.*

III. 13. **Blue**
14. *Purplish-blue.*
15. *Bluish-purple.*
16. *Purple.*
17. *Reddish-purple.*
18. *Purplish-red.*

II. IMPURE COLORS, OR THOSE NOT FOUND IN THE SOLAR SPECTRUM.

(*a*) SHADES, which may consist of either primary or secondary colors darkened by black (= complete or absolute shade).[1]

(*b*) TINTS, which may consist of either primary or secondary colors lightened by the admixture of white (= absolute degree of light).

(*c*) SUBDUED COLORS, which consist of combinations of two or more secondary colors, or of a secondary color with the primary which does not enter into its composition, *i. e.*, its complementary color, as green with red, purple with yellow, orange with blue, etc., the effect being to subdue or neutralize the colors which are thus combined.

WHITE COLOR.

Before concluding this part upon the origin and nature of color, it may be well to say a few words in particular on white color. We have already seen that white is produced by a body which reflects all the waves of light that strike it, whereas on the other hand if all the rays are absorbed, black is the result. A body through which all of the rays of light pass without absorption or reflection, is said to be without color, or transparent. If from a polished surface there is a regular reflection of the rays of light which strike it, we have as a result the production of images and such a surface is known as a mirror. If this polished surface is scratched or powdered, we observe instead of a regular reflection of the rays of light an irregular reflection, and according as there is water or air between the particles of the powder it will look either white or dark. The greater the reflection as in a dry powder the whiter the powder, and the less the reflection as in a wet powder the darker it will become. Snow is white because between an infinite number of crystals of water there is air. The same thing occurs in a starch paste which is nearly transparent and colorless; but if you precipitate the individual grains by freezing the mixture or paste, an infinite number of grains separate, each of which reflects the light and there results an appearance of white which is whiter when the liquid is replaced by air. If the latter is driven out there results a darker and finally a transparent body. In emulsions such as milk, etc., or the

[1] The principal shades may be classified as follows:

(*a*) SHADES OF PRIMARY COLORS.

1. of red (= red and black) = "maroon."
2. of yellow (= yellow and black) = "olive."
3. of blue (= blue and black) = "indigo," or "blue black."

(*b*) SHADES OF SECONDARY COLORS.

4. of orange (= yellow and red and black) = brown.
5. of green (= yellow and blue and black) = "dark green," "bottle-green," "myrtle green."
6. of purple (= blue and red and black) = "plum purple."

froth of any liquid, the white appearance is due to the irregular refraction between globules of air and oil from the surrounding medium. The hairs of plants and animals as well as the feathers of birds owe their whiteness to the air contained in dead cells; the object of this being to form probably in the plant a protection against evaporation of water and in the animal possibly a protection against giving off of heat. It also has no doubt in the latter an influence in "mimicry." (See Poulton.)

III. MORPHOLOGY AND PHYSIOLOGY OF SUBSTANCES IN PLANTS PRODUCING OR INFLUENCING COLOR.

A. COLORING PRINCIPLES OF A FIRST ORDER IN PLANTS.

By this group of coloring principles is meant all those which may be looked upon as fundamental pigments, as those contained in or associated with the plastids (both chloro- and chromo-plastids).

Pigments in plants are found either (1) associated with the plastids; or (2) dissolved in the cell sap or in ethereal oils; or (3) either impregnated in or incrusted upon the cell-wall.

Chloroplastids.

We now begin with the consideration of the plastids, and of this group we first take up the chloroplastids. If we make a section through a green leaf or stem, we find that in the cells below the epidermis there are numerous little green bodies, which vary in size from .003 to .011 Mm. and are more or less rounded or lenticular in shape, except in the lower forms of plants. They are found in greater abundance directly under the upper surface of the leaf than on the lower surface, the proportion being, generally speaking, about as 5 : 1. These grains, upon closer examination, are found to consist of a number of substances, viz.: (1) a colorless stroma, in which are imbedded (2) green granules; (3) colorless granules; (4) protein masses and (5) starch grains; finally (6) a membrane surrounding the whole. It is considered that from the stroma at one time starch is produced and at another time diastase; the conditions for the production of each being directly opposite; *i. e.*, when CO_2 assimilation is active starch is produced, and when this process is not going on, as at night, diastase may be produced. The green granules have been looked upon as the CO_2 assimilation apparatus or organ from which the oxygen is given off. The colorless grains may assist in the work of production of either starch or diastase, whereas the protein grains may be products resulting by reason of the CO_2 assimilation or may be in the nature of reserve material.

If CO_2 assimilation continues, there is produced a more or less centric or eccentric grain, or a grain having a more or less regular contour. If, however, the ferment, diastase, acts upon the starch already formed, the plastid changes its position to the side of the original grain upon which new layers are then deposited.

CHANGES IN COLOR OF CHLOROPLASTIDS.

So long as the plastids and the contents of the cell are alive, the membrane of each plastid gives it an individuality of its own, separating it from all other contents of the plant-cell excepting starch, which is produced by functional changes in the plastid. When the contents of the various plant cells lose their functions for any reason, the membranes of the plastids are dissolved, and the contents remaining unite with each other, forming a shapeless mass. There will also occur a change in the color of the mass, owing to the action of the cell sap acid, producing dark green or brownish green masses. The plastids may, however, retain much of their original color and even shape, if the plant after being gathered is quickly dried either in a current of *cool* dry air, or between *cool* dry bibulous paper. If the temperature of the paper or the air be higher than the surrounding temperature in which the plant was growing, color changes are likely to occur. If, on the other hand, this operation is performed in direct sunlight, the leaves will become more or less light green, or may even change (if allowed to remain too long) to a greenish-yellow or yellow color. This change being due to the change of the green coloring substance (chlorophyll) to etiolin, a substance very much resembling chlorophyll in that it is one of the few pigments that contain nitrogen. There are, however, certain marked changes in color which take place in all leaves during the fall of the year. At the end of the CO_2 assimilation period, when the plant has done the work mapped out for the summer, and as a result of which seeds have matured and buds are well stocked with nutriment, the leaves change color from a green to a yellow (as horse-chestnut) or red (as in maples, Ampelopsis, Rhus sp., etc.) This change is due to the fact that the green color of the chloroplastids is due to two and possibly three different classes of pigments, viz.: 1, a green pigment (chlorophyll) which is rich in nitrogen; 2, a yellow pigment (xanthophyll) which is free from nitrogen; and 3, a red substance (chrysophyll) giving a fluorescent appearance to its solutions.

At the end of the season those principles in the leaf which may be utilized by the plant are reabsorbed into the stem and stored in various places as in the bark, buds, roots or rhizomes. All compounds as those containing nitrogen and which are rich in potential energy, as chlorophyll, belong to the group that are valuable to the plant. With the re-absorption of the green pigment and the ground substance of the plastids there are left the now useless pigments, yellow and red, which with the tannin, calcium oxalate, and other contents in the leaf at the time of its disarticulation, are to be regarded as waste products. The yellow color in autumn leaves is due to the remaining xanthophyll. The difference in the amount of chlorophyll in the leaf in June and in September or October, prior to its fall, is about 1 : 25. In leaves with a red color the appearance is apparently due generally to the action of light and air upon tannin compounds producing the various tannin-reds or phlobaphenes.

In the spring of the year, with the germination of seeds and the development of buds, there arise again in the young shoots, providing they are growing under essential conditions, the chloroplastids already referred to. These are developed from the colorless plastids (leucoplastids) contained and produced in possibly every plant cell.

CHROMOPLASTIDS.

In many instances, as in roots (like carrot), or flowers (all yellow flowers), or fruits (any yellowish or orange-colored fruit), there is the replacement of the pigment of the chloroplastids by, or development of in the leucoplastids of a yellowish or orange-colored pigment or pigments. Plastids containing this pigment are spoken of as chromoplastids. There are three kinds of distinct pigments of this group, two of which are rather common, the third being limited in its distribution. Brief mention of these principles may be made as follows:

(1) Carotin,* a crystalline principle (in rhombic plates) first found in the root of *Daucus Carota* L., and supposed to be identical with xanthophyll of the chloroplastid, is characterized by being insoluble in water and alcohol, very sparingly soluble in ether, more soluble in benzin, chloroform and carbon disulphide. It thus differs from the xanthophyll of the chloroplastid in that the latter may be extracted with alcohol and held in a dilute alcohol solution while the chlorophyll is removed by means of benzin. Carotin is recognized by Krutsenberg as being the type of the lipochromes.†

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* *Carotin*, found in the root of cultivated carrot, occurs in golden-yellow to dark-red quadratic crystals. Insoluble in water, alcohol, aqua-alkalies and acids, sparingly soluble in ether and chloroform; soluble in benzol, ethereal and fixed oils, and in carbon disulphide with a blood-red color. Exposed to light it becomes colorless and uncrystalline. In concentrated sulphuric acid it produces a purple-red color, which the addition of water precipitates as dark-green flocks.

Hydrocarotin, a second coloring principle in root of cultivated carrot is also found in root of angelica. It occurs in large, colorless thin plates. Insoluble in water, soluble in hot alcohol, ether, chloroform, carbon disulphide, benzol, ethereal and fixed oils. In concentrated sulphuric acid it gives a ruby red color and forms an uncrystallizable precipitate on the addition of water.

† *Lipochromes* (word coined by Krutsenberg) are all substances soluble in chloroform, carbon disulphide, ether, alcohol, turpentine, etc. "They give one or two bands, and rarely three, in the blue half of the spectrum; they are sensitive to light when in solution, and vary in color from greenish-yellow to yellow, orange or red." The animal lipochromes are distinguished from the plant lipochromes in that the latter become blue or blue-green, whereas the former do not respond. (C. A. MacMunn, in Quart. Jour. Micros. Sci., xxx., p. 93.)

Krutsenberg takes carotin as a type of a lipochrome, the formula of which, according to Arnaud, is $C_{26}H_{44}O$. It is an orange crystalline principle found in green leaves, roots, yellow flowers and fruits (as tomatoes, carrots, etc.). The animal lipochromes, no doubt, correspond to plant lipochromes, although they have never been obtained pure enough for analysis. "There is no doubt but that such pigments as phycoxanthine,

(2) Besides carotin there is another principle found in the chromoplastid, viz., xanthin. This is distinguished from the former in that it occurs in amorphous masses which, while insoluble in water, sparingly soluble in benzin, ether and chloroform, are more soluble in alcohol.

(3) In the flowers of aloes there is a pigment found in the chromoplastids which is insoluble in ether and chloroform, but very soluble in alcohol.

PLASTIDS OF THE ALGÆ.

In the algæ a number of coloring principles are associated with the plastids. The reason for this is the fact that in many instances the algæ grow in such situations and at such depths that the plastids could not perform their functions unless there was some substance to absorb the rays which are received and considered valueless (as blue) and change them to waves of greater length (as red and yellow) which may be utilized by the plastids in the manufacture of food. Algæ growing in different situations possess different pigments giving their characteristic colors. I will simply mention these principles in the prominent groups.

1. In the Cyanophyceæ there is at least one, and possibly two pigments besides chlorophyll. These are: (1) Phycocyan, which is soluble in water, giving a light blue solution with a red fluorescence, (2) phycoxanthine, which somewhat resembles xanthophyll or carotin.

2. In the Peridineæ, Schütt found three pigments: (1) Chlorophyllin, resembling chlorophyll; (2) peridinin, soluble in alcohol with a red color, and (3) phycopynin, soluble in water, alcohol with a reddish-brown color.

3. In the Flindeæ is found besides a pigment resembling chlorophyll, another substance, phycoerythrine, which is insoluble in alcohol, etc., and produces with water red colored solutions.

4. In the Diatomeæ, besides chlorophyll, there is another substance, diatomin (also called phycoxanthine) which resembles carotin in some respects but is soluble in dilute alcohol.

5. In the Phycophyceæ there occur three pigments: (1) chlorophyll, (2) xanthophyll and (3) phycophæin. The latter is soluble in hot water

peziza-xanthine, orange xanthophyll, yellow xanthophyll, fucoxanthine and others are lipochromes." (MacMunn.) "As to animals, Krutsenberg states that the lymphatic fluids and various secretions of vertebrates and invertebrates, the vertebrate retina, the corpora lutea, the egg yolks of different species of animals, the yellow, green or red pigmented integuments of various invertebrates and of vertebrates from fishes to birds, owe their coloration, with few exceptions, to dissolved, granular or diffusely distributed lipochromes."

Also, to the lipochromes belong the following substances:

(*a*) Hæmatochrome, a red coloring principle found in Hæmatococcus.

(*b*) Bacteriopurpurin, a red coloring principle found in some bacteria which may be identical with Hæmatochrome of Cohn.

(*c*) Chlororubin of Rostafinisky.

(*d*) The lipochromes of Zoff and Bachman occurring in a number of fungi.

giving reddish-brown colored solutions; but is insoluble in alcohol, ether, etc.

CLASSIFICATION OF THE FUNDAMENTAL (GREEN AND YELLOW) PIGMENTS IN PLANTS.

Stokes (Proc. Royal Soc., xiii., p. 114), in 1864, found that in the land plants there were four coloring substances, two green and two yellow. The green substances yield solutions with a strong fluorescence, while the yellow substances do not give this effect. "Green sea weeds agree with land plants, except as to the relative properties of the substances present; but in olive-colored sea weeds the second green substance is replaced by a third green substance, and the first yellow substance by a third yellow substance, to the presence of which the dull color of these plants is due."

Subsequently H. C. Sorby (Proc. Royal Soc., xxi., p. 442), found the following coloring principles in plants:

I. Green. (1) Blue chlorophyll.
(2) Yellow chlorophyll.
(3) Chlorofucine.

II. Yellow. (4) Orange xanthophyll.
(5) Xanthophyll.
(6) Yellow xanthophyll.
(7) Lichnoxanthine.
(8) Orange lichnoxanthine.

I. The chlorophyll group (or greens) are all soluble in carbon disulphide, and insoluble in water, and agree "in having absorption bands at both ends of the spectrum, in having well-marked absorption bands at the red end, to the principle of which the strong red fluorescence is related, and in being decomposed with greater or less facility by weak acids into new products, giving somewhat analogous but yet quite distinct spectra to those characteristic of them in their natural state. All are rapidly decomposed in strong sunlight, when air is present, but not otherwise.

1. *Blue chlorophyll* occurs throughout the whole vegetable world, and may be best obtained for study from Fucus, Laminaria, and other brown algæ. Also in oscillatoria. Its color is a blue green.

2. *Yellow chlorophyll* occurs in most green plants associated with the blue chlorophyll, from which it may be separated by removing the blue chlorophyll from solution by means of benzol. It may be obtained from certain algæ, as Ulva, etc.

3. *Chlorofucine* occurs with the two other fundamental colors in various algæ, as Fucus, etc.

II. *The xanthophyll* (or yellow) group are characterized by being insoluble in water, but are soluble in carbon disulphide, fixed oils, and give "spectra with two more or less well-marked absorption-bands, varying in position with the particular substance, and very creditably raised towards the blue end when a liquid of great band-raising power is used as a sol-

vent. Weak acids or alkalies have no immediate effect in altering the position of the bands, but when dissolved in absolute alcohol, all of the members of the group are slowly decomposed by a little hydrochloric acid, gradually fading to a colorless solution, even in the dark." There is no doubt but that air or even another (sensitizing) substance may be the cause of the change.

4. *Phycoxanthine*, was obtained by Sorby from *Peltigera canina* (a lichen) when growing in damp shady places or from species of Oscillatoreæ when growing exposed to sunlight. On adding a little hydrochloric acid and turpentine to this substance, the color gradually fades, without the production of any well-marked intermediate colored substance.

5. *Peziza-Xanthine*, an orange-yellow coloring substance obtained by Sorby from *Peziza aurantia* and other fungi. It closely resembles phycoxanthine.

6. *Orange xanthophyll* is considered to be one of the most universally distributed of all vegetable coloring matters. It may be obtained from the orange-colored antherozoids of *Fucus serratus*, from *Peltigera canina* and from oscillatoreæ.

7. *Xanthophyll* is obtained in the pure state from *Porphyra vulgaris*, from dark colored varieties of wall flowers (*Cheiranthus cheri*, and with more difficulty from green and yellow leaves.

8. *Yellow xanthophyll* is obtained from different kinds of bright yellow flowers, as, for instance, chrysanthemum.

9. *Fucoxanthine* is the principal coloring matter of Fuci and other brown algæ. It appears to be closely related to xanthophyll.

III. *The Lichnoxanthine group* are found most abundantly in lichens and fungi, and, inasmuch as they occur more generally in lichens, the name *lichnoxanthine* was proposed by H. C. Sorby. "They are all insoluble in water, but soluble in carbon disulphide, but have a far greater tendency to dissolve in alcohol, and in some cases easily pass into a modification which is insoluble in the disulphide and yet readily dissolved by absolute alcohol. The spectra do not show any well marked absorption bands, but merely a general absorption, extending more or less from the blue end." They differ from xanthophyll in that they resist much more the action of light and acid. It is not known whether the lichnoxanthine substances are essential for the growth of lichens.

10. *Orange lichnoxanthine* is obtained from *Peltigera canina* (lichen) when grown in the sun and from *Platysma glaucum*, etc.

11. *Lichnoxanthine* occurs in nearly all plants, though in some cases in small quantities. It is best obtained from *Clavaria fusiformis*. It is very difficult to separate from the orange lichnoxanthine.

12. *Yellow lichnoxanthine* is obtained from *Parmelia parietina*, and differs from the other lichnoxanthines in being of a purer yellow.

IV. *Phycocyan group* includes a number of principles obtained from certain algæ as Cyanophyceæ, and includes

13. *Phycocyan*, which possesses "a well-marked absorption band in the orange, and has a very red intense fluorescence."

14. *Pink phycocyan* has the principal absorption band between the yellow and the green, and is of an intense orange fluorescence.

V. *Phycoerythrine* group includes a series of non-fluorescent principles, soluble in water, and obtained from certain algæ, as Florideæ. It includes

15. *Pink phycoerythrine*, which gives a spectrum and an absorption band at the yellow end of the green.

16. *Red phycoerythrine*, which has a spectrum and an absorption band at the blue end of the green.

VI. *Erythrophyll group* includes principles which are mostly products of other principles formed under particular conditions. They include a large number of coloring matters found in leaves and petals of plants. They are insoluble in water and carbon disulphide.

VII. *Chrysotannin groups* are interesting because of their relationship with the products that cause the tints of autumnal foliage, some of which are due to oxidation. They are all pale yellow in color, soluble in water, and slowly affected by light.

COLORING PRINCIPLES OF A SECOND ORDER IN PLANTS.

Under this group are included all those principles which are dissolved in the cell-sap or contained in the cell-walls, and which either themselves are colored, or which, though colorless give certain color changes (which may be either transient or permanent) either on account of a change in their physical condition or by reason of reactions with certain chemicals.

It is well-known, for instance, that most essential oils are colorless, or nearly so, when pure or fresh, but acquire various colors on exposure to light and air. The same may be said, to a certain extent, of the resins, alkaloids, glucosides, etc. The cause of these changes is not wholly known. They may be due to the action of certain impurities or coloring principles, as chlorophyll or curcumin in some essential oils. Quercetin or tannin may be associated with some of the resins and other principles, etc.

The coloring principles of a second order may be divided according to the colors that they possess either in a powder or when in solution or when acted upon by the air and moisture, or treated with reagents, into the following groups.[1]

I. *Green Coloring Principles.*—These principles of themselves appear to be limited in number. There are, however, a large number of tannin-like products which give green colorations with the salts of iron.

II. *Yellow Coloring Principles.*—Under the class of substances which are either yellow or become yellow, may be grouped a large number of substances as most of the volatile and fixed oils; some of the glucosides

[1] The enumeration of these substances or principles is withheld for the present on account of the voluminous character which the paper has already assumed.

and products of decomposition of other glucosides; others belong to the organic acids (tannins), or the alkaloids. It seems that the more prominent of the yellow coloring principles are yielded by the decomposition of quercetin, tannin and similar bodies.

III. *Red Coloring Principles.*—To this group belong some of the most important coloring principles of the arts, viz., crocin, alizarin, purpurin, munjistin, morindin, hæmatoxylin, alkanna red, etc. All of the plants containing tannin yield upon oxidation reddish-colored principles. Numerous alkaloids and other active principles give red-colored compounds with various reagents.

IV. *Purplish or Blue Coloring Principles.*—This group includes a number of active principles, organic acids, commercial dye principles (as indican, lichenin) and other substances which are colored blue by reagents, as starch, etc.

V. *Brown Coloring Principles.*—We find included here principles which have been acted upon by H_2SO_4, as codeine, gelsemine, grape sugar, etc.; or else those which have been altered on exposure to light (as nicotine), or air (as harmalin), or by the action of various reagents.

VI. *Grey Coloring Principles.*—Only a few substances are grey in color, as liquid storax.

VII. *Black Coloring Principles.*—As the final product of decomposition, a number of sugar-like substances and organic acids are turned black by either H_2SO_4 or heat.

VIII. *White Coloring Principles.*—A large number of principles as obtained from plants and purified from other products are nearly white in appearance. They include substances like cellulose, starch, sugars, organic acids, various active principles, etc.

IX. *Colorless* (*or nearly colorless*) *Principles.*—A great many substances crystallize in nearly transparent crystals. A number of oils when pure, or nearly so, are almost colorless.

COLORS OF POWDERED DRUGS.

In a paper which the author presented a year ago on the qualitative examination of powdered drugs, they were divided according to color into five principal groups:

I. Color, some shade of light green to gray.

II. Color, nearly white.

III. Color, some shade of yellow.

IV. Color, varying from some shades of tan or ecru to dark brown, or even dark-blue or black.

V. Color, some shade of red.

In this work it was shown that there were quite a number of drugs that might be very easily placed in at least two of these groups. This year, however, the work has progressed so far that a comparative study of the

drugs has been made with the view of ascertaining the number of colors which are present in each drug. This part of the work has been done by Herbert J. Watson, of Wilmington, Del., and it is possible from his results to establish about 18 or 20 fundamental groups (allowing, of course, for certain variations in shade) which include all of the official vegetable drugs, pulveres, and some non-official drugs. These fundamental groups may be said to form a set of *Color Standards* of the drugs examined, and are as follows:

I. White. II. Light yellow ochre. III. Dark yellow ochre. IV. Lemon yellow. V. Luminous yellow. VI. Pink. VII. Rose. VIII. Yellowish red. IX. Red. X. Yellowish brown. XI. Raw sienna. XII. Raw umber. XIII. Vandyke brown. XIV. Sepia. XV. Light green. XVI. Hooker's green. XVII. Yellowish green. XVIII. Sap green. XIX. Brownish green.

The following are the artists' water colors which enter into the composition of these fundamental groups of the *Color Standard* proposed: (1) Chinese white; (2) Lemon yellow; (3) Gamboge; (4) Yellow ochre; (5) Rose madder; (6) Crimson lake; (7) Vermilion; (8) Light red; (9) Burnt sienna; (10) Raw sienna: (11) Hooker's No. 1; (12) Hooker's No. 2; (13) Sap green; (14) Cobalt blue; (15) Ivory black; (16) Raw sienna; (17) Cadmium yellow; (18) Vandyke brown; (19) Brown madder; (20) Sepia.

I append a list of the drugs arranged according to the group in the *Color Standard* to which they belong, with the names of the colors that enter into them. The figures 1, 2, 3, 4, 5, 6, indicate the decreasing proportions of the respective colors, *e. g.*, Saccharum has of Chinese white (1) and of cobalt blue (2). This means that the white is in excess of the cobalt blue. It will be seen that the groups have been reduced to but sixteen by reason of putting two groups together, as Raw Sienna and Raw Umber. It is even possible to further reduce the number, which time may show to be advisable.

I. *White Group.*

	Chinese white.	Cobalt blue.	Yellow ochre.	Lemon yellow.
Saccharum	1	2		
Pulv. Cretæ Co.	1	2		
Acacia (Pulv.)	1	.....	2	
" (Gran.)	1	.....	2	
Amylum	1	.....	2	
Tragacanth	1	.....	2	
Sassafras Medulla	1	.....	2	3
Nux Vomica	2	.....	1	

II. *Light Yellow Ochre Group.*

	Chinese white.	Lemon yellow.	Yellow ochre.	Raw umber.	Burnt sienna.	Sap green.
Pulv. Morph. Co.	1	3	2			
Lycopodium	2	3	1			
Iris Florentina	2	.....	.....	1		
Colocynth	2	.....	.....	1		
Scilla	2	1	.....	3		
Quassia	3	2	1			
Piper album	3	2	1			
Sinapis alba	3	1	2			
Zingiber	2	.....	.....	1		
Pepo	2	.....	1	3	.....	4
Pulv. Jalapæ Co.	1	.....	2	.....	3	
Aloes (Cape)	3	.....	1	.....	.....	2
Manna.						

III. *Dark Yellow Ochre Group.*

	Raw umber.	Chinese white.	Yellow ochre.	Lemon yellow.	Sap green.	Ivory black.	Burnt sienna.	Gamboge.	Rose madder.
Phytolaccæ Rad	1	2	3						
Aurantii Am. Cortex	2	3	1						
Chirata	1	4	2	3	1				
Chondrus	1	....	2	....	....	3			
Serpentaria	2	4	1	3					
Senega	3	4	1	....	....	5			
Matricaria	1	4	3	....	....	5	....	2	2
Zingiber (Af.)	2	3	1	....	....	4			
Caulophyllum	2	3	1	....	4				
Asafoetida	....	....	1	....	....	....	2		
Galla	....	3	1	....	....	4	2		
Menispermum	3	2	1						
Pulv. Glycyrrh. Co	3	1	2						
Chenopodium	2	....	1	....	....	3			
Pareira Brava	1	....	2	....	....	3			
Jalapa	4	3	2	....	....	....	1		
Hellebore (American)	2	3	4	....	....	.. .	1		
Hellebore (White)	3	1	2						
Ipecacuanha	2	....	1	....	....	....	....	....	3
Aloes (Barbadoes)	1	4	3	....	....	2			
Lappa	3	2	1						
Mezereum	3	2	1						
Gelsemium	....	4	1	....	....	....	3	2	

IV. *Lemon Yellow Group.*

	Chinese white.	Cobalt blue.	Gamboge.	Lemon yellow.	Yellow ochre.	Raw umber.
Linum	3	.....	.....	1	4	2
Ammoniac	1	2	3			
Terebinthina	3	.....	.....	1	2	
Mastic.						

V. *Luminous Yellow Group.*

	Chinese white.	Lemon yellow.	Yellow ochre.	Raw umber.	Gamboge.	Light red.	Ivory black.	Sap green.	Cadmium yellow.	Burnt sienna.
Glycyrrhiza (Russian)	3	1	2							
" (Spanish)	4	2	1	3						
Cambogia	....	....	....	....	1					
Calendula	....	4	3	....	1	2				
Dulcamara	....	4	1	2	....	....	....	3		
Hydrastis	....	3	....	....	1	....	4	2		
Macis	....	....	1	....	....	....	....	....	2	3
Sambucus	2	1	....	3						
Calumba	....	4	1	2	....	....	3	5		
Rhamnus cathartica (bark)	....	.. .	3	1	4	2				
Rhus glabra (berries)	3	....	2	1						

VI. *Pink Group.*

	Yellow ochre.	Chinese white.	Rose madder.	Raw umber.	Burnt sienna.	Ivory black.	Crimson lake.
Quillaja	1	2	3				
Stillingia	.....	2	1	3			
Cardamom (Seed and Cap.)	1	2	.....	.....	.....	3	
Pulv. Rhei. Comp.	2	1	3				
Pulv. Ipecac. et Opii	2	1	.....	.....	.....	.....	3
Benzoin	2	3	.....	.....	1		

VII. *Rose Group.*

	Rose madder.	Cobalt blue.
Rose (red)	1	2

VIII. *Yellowish-Red Group.*

	Light red.	Lemon yellow.
Capsicum (Japan)	1	2
Capsicum (Hungarian)	1	

IX. *Red Group.*

	Light red.	Raw umber.	Burnt sienna.	Chinese white.	Gamboge.	Rose madder.	Cobalt blue.	Ivory black.
Sanguinaria	1	2	3					
Crocus	1	2	.....	3	4			
Kamala	1	3	2	.....	1			
Haematoxylon	4	2	1	.....	.....	.....	.....	3
Kino	.....	.....	.....	.....	.....	1	2	3
Lupulin	2	.....	4	.....	.....	.....	.....	3

X. *Yellowish-Brown Group.*

	Raw umber.	Yellow ochre.	Cream yellow.	Chinese white.	Light red.	Burnt sienna.	Ivory black.	Gamboge.	Sap green.
Rumex	1	2	3	4	5				
Rheum	2	....	4	5	1	3			
Guaiaci Lignum	1	2	....	....	....	3			
Arnicæ Flores	1	2	....	....	....	....	3	4	
Anisum	2	1	....	3					
Fœniculum	3	1	....	....	....	....	....	....	2
Sinapis nigra	3	2	1	4					
Copaibæ Resina									

XI. and XII. *Raw Umber and Sienna Group.*

	Raw umber.	Raw sienna.	Yellow ochre.	Chinese white.	Burnt sienna.	Light red.	Lemon yellow.	Gamboge.	Ivory black.	Rose madder.	Sap green.
Asclepias	2	....	1	3							
Bryonia	2	....	1	3							
Prunus Virginiana	....	....	2	3	1						
Krameria	....	....	2	3	1						
Benzoin (Vanilla)	....	....	3	....	....	1	2				
Cinchona (pale)	1	....	....	....	2						
Sassafras	1	....	3	4	2	5					
Lupulin	....	....	....	....	4	2	....	1	3		
Capsicum (Af.)	2	....	3	....	1						
Caryophyllus (Penang)	1	....	2								
Caryophyllus (Zanzibar)	....	....	2	3	1						
Cinchona (Red)	....	....	2	....	1						
Viburnum prunifol	1	....	3	4	2						
Myristica	4	....	2	..	3	....	1				
Gossypii Rad. Cortex	1	....	2	3							
Cascara Sagrada	1	....	3	....	2						
Euonymus	3	....	1	2							
Rose (pale)	....	....	2	3	1	....	....	....	....	4	5
Colchici Sem.	....	....	2	3	1						
Cinnamon (Cassia)	....	....	2	3	1						
" (Saigon thick)	....	....	2	3	1						
" (Ceylon)	....	....	2	3	1						
Pulv. Aromaticus	....	....	3	2	1						
Podophyllum	1	....	2	3							
Illicium	....	....	....	2	1						
Cubeba	2	....	1	3							
Cusso	1	....	4	3	2						
Myrrha	....	....	4	....	2	....	....	1	3		
Aspidosperma	....	....	2	3	1						
Gentiana	1	1	3	4	2	....	....	....	5		
Triticum	1	1	....	2							
Aurantii Dulc. Cortex	2	....	1	3	....	....	4				
Limonis Cort	....	....	2	....	1	4	3				
Coriandrum	1	....	2	3							
Calamus (nat.)	....	....	3	1	....	....	....	....	...	2	
" (bleached)	....	....	3	1	4	....	....	....	....	2	
Quercus alba	....	...	3	2	1						
Krameria	....	....	....	3	1	2					
Myristica	4	3	2	....	....	....	1				

XIII. *Van Dyke Brown.*

	Burnt sienna.	Yellow ochre.	Chinese white.	Raw umber.	Rose madder.	Light red.	Gamboge.	Ivory black.	Lemon yellow.
Aconitum	....	1	2	3					
Cinnamon (Saigon)	1	2	3						
" (thick bark)	1	2	3						
" (thin bark)	1	2	3						
Guarana	2	....	....	....	2				
Geranium	1	5	6	4	1	3			
Strophanthus	2	1	4	3					
Aspidium	....	2	3	1					
Conium	3	1	....	2					
Carum	....	2	....	1					
Rubus	....	1	....	2	....	....	....	....	3
Belladonnæ Radix	2	1	4	3	....	....	....	5	
Rhus glabra (bark)	....	2	3	1	....	....	....	4	
Pyrethrum	2	1	5	3	....	....	....	....	4
Sumbul	....	1	4	2	....	....	....	3	
Viburnum opulus	1	3	2						
Inula	....	2	3	1					
Apocynum Cannab.	....	1	2	3					
Sarsaparilla (Hond.)	4	1	2	3					
Tr. Opii Deod. (powder)	....	2	....	1	....	....	....	3	
Aloes (Soc.)	....	....	....	1					
Leptandra	....	3	2	1					
Cinchona (yellow)	3	2	....	...	....	....	1		
Cinnamon (Cassia)	1	2	3						
Catechu	....	....	....	1					
Cascarilla	1	2	3						
Colchici Semen	2	....	4	1					
Pimenta	1	2	3	3					

XIV. *Sepia Group.*

	Chinese white.	Yellow ochre.	Raw umber.	Ivory black.	Lemon yellow.	Rose madder.	Cobalt blue.	Burnt sienna.	Crimson lake.
Physostigma	1	2	3						
Cardamom seed	1	4	3	2					
Cocculus	3	1	2	4					
Sarsaparilla (Mex.)	1	4	2	3					
Cypripedium	4	1	3	....	2				
Cimicifuga	2	3	1						
Ergota	....	....	....	3	....	1	2		
Spigelia	....	....	3	....	....	1	2		
Arnicæ Radix	5	3	1	4	....	....	....	2	
Taraxacum	....	2	1	4	5	....	....	3	
Colchici Radix	1	2	3						
Cetraria	2	1	3						
Convallaria	....	2	1						

Sepia Group—Centtnued.

	Chinese white.	Yellow ochre.	Raw umber.	Ivory black.	Lemon yellow.	Rose madder.	Cobalt blue.	Burnt Sienna.	Crimson lake.
Juglans	...	1	2	3					
Opium (gran)	....	....	2	1					
Piper nigrum	2	....	....	1					
Valerian	2	....	1						
Cantharis (Chinese)	....	....	2	1					
Phytolaccæ Fructus	2	....	....	1					
Stramonii Semen	2	....	3	1					
Vanilla and Sugar	1	3	....	....	....	....	4	....	2

XV. *Light Green.*

	Hooker's No. 2.	Gamboge.	Raw umber.	Lemon yellow.	Sap green.	Cobalt blue.	Rose madder.	Burnt sienna.	Yellow ochre.	Hooker's No. 1.	Chinese white.
Anthemis	1	2	3	4							
Humulus	4	5	....	....	1	2	3	6			
Grindelia robusta	....	....	2	....	3	....	....	....	1		
Buchu (short)	....	....	....	....	2	....	....	....	1	3	4
" (long)	....	....	....	....	1	....	....	....	3	2	
Senna (Alex.)	....	....	3	....	1	....	....	....	4	2	

XVII. *Yellowish Green.*

	Yellow ochre.	Hooker's No. 1.	Gamboge.	Raw umber.	Sap green.	Hooker's No. 2.
Sabina	1	2	3	4		
Uva Ursi	.....	2	5	4	1	3

XVIII. *Sap Green.*

	Sap green.	Yellow ochre.	Chinese white.	Lemon yellow.	Hooker's No. 2.	Raw umber.	Ivory black.	Hooker's No. 1.	Gamboge.	Light red.	Burnt sienna.
Xanthoxylum	1	2	3	4							
Bellad. Fol. (Germ. Cult.)	1	....	....	....	2						
" " (Eng. Allen's)	1	....	3	....	2						
" " (B. & C.)	1	2	3								
" " (Germ. Wild)	1	3	...	....	....	2					
Guaiac Resin	1	....	....	....	4	2	3				
Styrax	1	2	....	...	....	....	3				
Granatum	2	....	....	....	....	4	....	1	3		
Scoparius	1	....	....	....	....	2					
Eucalyptus	3	1	5	....	....	2	....	4			
Eriodictyon	1	2	....	....	....	3					
Salvia (Ital.)	1	2	....	....	....	3					
" (Amer.)*	1	2	....	....	....	3					
Senna (Tinn.)	1	3	....	....	2						
Chimaphila	1	3	5	....	....	4	....	2			
Castanea	1	3	....	....	....	....	....	2			
Eupatorium	1	4	....	....	....	3	....	2			
Coca	1	....	5	....	3	6	....	2	....	4	
Scutellaria	1	....	....	....	....	....	....	2	....	3	4
Melissa	1	....	....	....	....	3	....	2			
Pulsatilla	2	1	5	....	....	4	....	3			
Absinthium	1	2	3								
Marrubium	2	4	3	....	....	1					
Tanacetum	1	3	4	....	....	2					
Matico	1	2	6	....	....	4	5	....	....	....	3
Mentha viridis	1	2	3	....	....	4					
Hedeoma	1	3	4	...	....	2					
Hamamelis	1	3	4	....	....	2					
Lobelia	1	....	5	....	2	3	....	....	....	4	
Stramonii Folia	1	....	....	....	....	3	....	2			
Hyoscyamus	1	2	....	....	....	3					
Chelidonium	2	5	4	....	1	3					
Cannabis Indica	1	....	4	....	2	3					
Digitalis	1	....	....	....	....	3	....	2			
Cantharides (Russ.)	....	....	....	4	....	2	....	3	....	....	1
Staphisagria	2	3	....	....	....	1					

*More sap green in this than Italian.

I have had Mr. Watson, in a number of the more or less greenish colored drugs, reproduce the colors. The twenty paintings which I show you will illustrate how much more desirable a standard based on the colors contained in each drug would be than one referring each drug to the color standard already proposed. Time did not permit the carrying on of the work to its completion, but it occurred to me that all of the drugs might be arranged in diamond-shaped pockets on suitable card-boards.

Permanence of Colors and Color Plates.

The question of the action of light upon both natural and artificial dyestuffs has been a very important and perplexing one. A few years ago, the British Association for the Advancement of Science appointed a committee to investigate this subject. The committee tested a large number of yellow and red dye materials, both natural and artificial, as to their durability. The report of this committee will be found in Chem. News, 1893, (vol. lxviii, p. 155; vol. xxx, p. 154, 169, 183.) The general results are given on pp. 171 (vol. lxviii), and 184 (vol. lxxi).

Believing that this Association would desire to hear an expression from the author of one of the text-books in which colored plates are used, I wrote Prof. W. Simon, of Baltimore, and asked him (1) whether color plates could be made which would be permanent (say for ten years) and (2) where such plates could be made. His reply is essentially as follows:

"There are many colors which will be as good after twenty-five or fifty years as when first made. All the plates gotten up for the first edition of my book fifteen years ago, and made with inorganic matters, are absolutely good to-day. Those made with aniline colors (alkaloid reactions) have in several cases faded—though not seriously."

The Answer to the Question.

The question, Is it practicable to provide a set of color standards of powdered vegetable drugs? remains to be answered. The nature of the answer is dependent upon the object of the standard. If the object of the latter is for legal purposes or for determining the valuation of drugs, we seriously question the propriety and practicability of such a standard. It will be much easier for the dealer who admixes and adulterates his goods to bring them to a standard color than for the person who selects the best drugs he can find in the market. Color in vegetable drugs as we have seen is changeable, in fact, so unstable being dependent upon such a number of conditions that it makes it impracticable to devise any standard to which commercial material may exactly correspond. There is a probability that when we know more about the pigments in plants, that these principles will be extracted and solutions of them compared to a photometric scale or examined by means of the spectroscope for identification or valuation of the drugs containing them. It was because of the possibilities for the development of a scientific standard which might be desired or found necessary for the purpose of the United States Pharmacopœia, that I spent so much time in trying to collaborate all of the facts relating to this subject of color. But I take it that what is desired in the making of a color standard is not something having any great weight from a legal standpoint or in the valuation of drugs, but a scale which will enable us one and all to understand what, for instance, is meant by a yellowish-brown or white color, etc. The adoption of such a scale will unques-

tionably tend to a uniformity in the description of colors, and will assist the Revision Committee of the United States Pharmacopœia in conforming its language in regard to colors to a standard measure or scale which it has adopted.

Even in this respect there are some limitations, as any one who has done any work on the study of colors in powdered vegetable drugs will readily appreciate. The color standard that may be painted will not change so much as the drugs. Some of them seem to be continually changing. This may be more or less imaginary. The color is, however, dependent upon the intensity of the light, and the direction in which its rays strike the powders. There is also a great difference in color depending upon the time one has been looking at the powder. In comparing a powder with the color standard, both should have as nearly as possible the same illumination and the same amount of time should be given to the observation of each. Only certain hours of the day can be employed satisfactorily for this comparison of colors.

It was hoped that the drugs examined might be compared with a duplicate lot that have been exposed to diffused daylight since the time when this investigation was begun. This, however, could not be arranged, and, in reality, the only beneficial purpose this could have served would have been to demonstrate that in most all vegetable drugs there is a change in color owing to the action of air and light, and in many cases, even in darkness, a change is manifest.

The most important question is, however, does this change mean deterioration? In some cases it probably does, as in drugs like Pulsatilla, Ergot, etc. In other drugs it means rather a change for the better, as in Rhamnus Purshiana, Juglans, etc. In the majority of cases, however, there seems to be neither deterioration nor improvement in the drug. It would be well if some one, during the coming year, could make assays of a drug at one time, and then after exposing the drug to light and air in a glass container, or on storage in can, box or paper (or better under all these conditions), repeat assays. This would answer the question for the drugs considered.

I desire to acknowledge my indebtedness to Mr. Herbert J. Watson for his fidelity in executing the paintings and arranging the cards accompanying this paper, and to Messrs. Gilpin, Langdon & Co., for the use of their mills, and for their courtesy in supplying me with the drugs for the investigation.

The speaker was heartily applauded when he had finished.

THE CHAIR: Gentlemen, it now gives me very great pleasure to introduce to you a new member, but one who is likely to become a very active worker in this Section, Prof. Albert Schneider, of the Northwestern University, of Chicago. He will read you abstracts of two papers, one on the Identification of Powdered Drugs, the other on Some Suggestions on the Examination of Drugs.

Mr. Schneider spoke of his papers in abstract, and exhibited a number of plates prepared from microscopical specimens.*

THE CHAIR: I think it is not out of place to direct your attention to the original nature of this work, as well as that done by Prof. Kraemer, as shown by his paper just preceding this one. We are no longer borrowing from foreigners, but do our own work.

Mr. Alpers then presented a paper on Odor Standards in the Pharmacopœia.

ODOR STANDARDS.

BY WILLIAM C. ALPERS.

The question whether it is practicable to provide a set of odor standards in the United States Pharmacopœia is not a new one. Repeatedly the attention of chemists and pharmacists has been called to this subject, and many efforts have been made to give a satisfactory answer. As old a teacher as Linnæus tried to classify the various odors by dividing them into seven classes, to which Zwaardemacker, of Utrecht, in 1895, added two more. As a matter of history these various classes may here be cited.

1. Ethereal Odors (odores ætherei), represented by Ethyl Butyrate (essence of pineapple).
2. Aromatic Odors (odores aromatici), represented by Oil of Cloves.
3. Balsamic Odors (odores fragrantes), represented by Vanilla.
4. Amber—Musk Odors (odores ambrosiaci), represented by Musk.
5. Alliaceous Odors (odores alliacei), represented by Mercaptan.
6. Empyreumatic Odors (odores empyreumatici), represented by Creosote.
7. Hircine Odors (odores hircini), represented by Caproic Acid.
8. Disagreeable Odors (odores tetri), represented by Nicotine.
9. Nauseating odors (odores nausei) represented by Skatol.

Besides these there were many subdivisions to each class.

Another similar classification has lately been made by Prof. C. B. Lowe,

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* The absence of these two papers in the printed Proceedings is best explained by the following letter of the author: THE GENERAL SECRETARY.

CHICAGO, *October* 6, 1899.

Chas. Caspari, General Secretary American Pharmaceutical Association:

My Dear Sir: Regarding your request for my papers read at the Put-in-Bay meeting would state that owing to an oversight on my part I failed to notify the Scientific Section that both papers were read in abstract only, and that they were not intended for publication in the Proceedings. The paper on "Powdered Drugs" will be published in book form. It will contain 170 full-page illustrations and about 200 pages of text. It is evident that it could not be published in the Proceedings. The paper on "Hints on the Examination of Drugs" will be included as a part of a work on Pharmacography.

Regretting my negligence in not explaining the matter at the time of the meeting, and hoping that the above explanation is satisfactory, I am

Very truly yours, ALBERT SCHNEIDER.

of Philadelphia, in an able paper read before the Pennsylvania Pharmaceutical Association.

While such classifications undoubtedly have their values, yet they are open to criticism; for there are many odors that according to the inclination of the observer may be put into the one or the other class. Carbolic acid, for instance, is classified among the chemicals belonging to the aromatic series, and its odor is considered aromatic by some, while others call it decidedly disagreeable. For scientific purposes, however, the selection of classes cannot be left to the likes and dislikes of the observer; a more correct and accurate arrangement is needed, based either on logical deductions or indisputable observations. To arrive at such a foundation it is necessary to consider in short the physiological side of smelling. We all know that the irregular cavities that form the nasal fossæ are divided into a number of chambers lined by the Schneiderian membrane. This membrane contains mucous glands which secrete mucus for the purpose of keeping the membrane constantly moist, and a number of epithelium cells of various kinds. Whenever odorous particles are present in the inspired air, they are carried by the suction of the expanding lungs through the lower nasal chambers into the upper chambers, where they fall on the olfactory epithelium and produce sensory impulses, which, communicated to the brain by means of the olfactory nerves, give rise to sensations of smell. The question that interests us in this physiological function is, how these impulses are caused, and what relation does there exist between the volatile substance and the serum secreted by the glands? For it is well known that without this serum no impression on the nerve is made. If the mere shock of a volatile substance on the nerve-ends would produce the sensation, there could be no variety of odors, and the introduction of a substance of greater aggregation than a gas—a liquid, or even a solid particle of dust—would also produce this sensation. Again, if the various glands and membranes in the nasal cavity are removed permanently or their function is arrested by some injury or disease, there is no smell, showing that the nerve alone does not allow us to smell. Nor are the glands, by their mere presence, productive of the sensation; they must perform a certain function, namely the secretion of the serum which covers the cup shaped ends of the nerves, and this secretion must go on continuously, as can be shown by a simple experiment. When a volatile substance dissolved in water—for instance, an aqueous solution of an ethereal oil—is brought into the nostrils and kept there, by reclining the head, it will first produce the sensation, but the odor will soon disappear, in spite of the presence of the odorous solution in the nostrils. The explanation for this is simple. The secretion on the nerve-ends is affected by the volatile substance, but as no new serum can take the place of the one that has been acted upon on account of the pressure of the liquid on the membrane, the sensation naturally ceases, to begin again after the liquid has

been removed and a new serum ejected from the glands. It has been suggested that the sensation of smelling might be caused by the fact that the peculiarly constructed molecule of a volatile substance touches a molecule of the secreted serum and sets it moving, without, however, undergoing any change, just as one wheel of a watch will set another in motion, etc. This theory is hardly tenable: for aside from the fact that we have no knowledge of the special construction of a molecule, we would have to assume that the molecule of the serum is so multiform as to adapt itself to each approaching volatile molecule, a supposition which is absurd in the light of our present knowledge of constitutional molecular structure. There remains therefore but one supposition, namely, that the sensation of smelling is aroused by a *chemical reaction* taking place between the odorous substance and the serum on the membranes of the organ.

Luckily we have further proof of the correctness of this view. Dr. O. I. B. Wolff, of Dresden, has instituted a series of microscopical experiments in which the chemical change could be observed with the eyes. Unable to prepare the serum of the smelling organ of a man or vertebrate for microscopical examination, owing to its almost instantaneous change when removed from its place of formation, he resorted to the examination of the serum of the bee, whose organ of smelling was particularly adapted for this purpose. He found the serum to consist of a clear liquid, in which a great number of white oil-like globules floated, resembling in all appearances, except color, the blood with its corpuscles. All efforts to find a preserving liquid for this secretion in order to prepare it for microscopical examination failed, for as soon as it was brought into contact with any chemical or solution an instantaneous change would occur. The addition of water alone would retard the decomposition long enough to allow a quick microscopical examination, although the floating molecules would gradually swell and then burst, following the laws of osmosis. But by patient and careful experiments in which, as Dr. Wolff states, thousands of bees lost their lives, he positively proved that a chemical change takes place. If a small object dipped into a volatile liquid be brought near the drop of serum under the microscope a sudden motion of the corpuscles is observed, varying with the nature of the volatile substance. A molecule of the vapor preceding the object evidently entered the liquid and produced the change. The small globules gradually take a different color, mostly gray and brown; they become wrinkled and sometimes expand until they suddenly disintegrate and disappear. Ammonia gas seems to have the strongest influence, the globules assuming a violent motion even at a considerable distance of the gas, and by sudden approach disappearing as by magic. Dr. Wolff also observed that when the action of a slow-acting substance, for instance a but slightly odorous oil, was interrupted by withdrawing the substance before the globules had disappeared and then ammonia vapor brought into nearness with great care, the

motion and behavior of the corpuscles were different than when ammonia had acted on them at first. The partial decomposition of the first substance changed, therefore, the influence of the ammonia gas, showing that a chemical change had taken place. No other explanation for the behavior of the corpuscles under the influence of vapors can be given.

And if there should still exist any doubt that the process in man is similar to that in the bee, another proof of the chemical reaction in the serum of the nose can be brought forth by different experiments and methods of reasoning.

If the nostrils of a reclining person are filled with a solution of a 0.6-per cent. of sodium chloride, the so-called physiological salt solution, no sensation whatever is noticed. If now an electric current is allowed to pass through this solution, by putting one electrode on the forehead and the other in the salt solution, a sensation at the smelling nerve is at once observed, differing when the two electrodes were changed. The explanation for this behavior is simple. According to the dissociation theory of salts, as advanced by Ostwald and others, there are two ions present in the solution, the cathion sodium and the anion chlorine. By passing the electric current through it the cathions gathered around the negative pole, and the anions around the positive. According to the kind of ions collected around the end of the nerve, a different odor was observed, for chlorine, as well as sodium, acts on the secretion. We therefore do not smell the electricity, as it is sometimes stated, but we smell the ions that were driven to the nerve-ends by means of electricity. To still further verify this experiment, I tried a solution of sodium nitrite, the ions of which are Na and NO_2, with the same result, namely that the electric current produced a faint odor of nitrous acid if the positive pole was laid in the nerve of smelling, while when the negative pole was laid there, the same sensation was experienced as with the solution of sodium chloride, the cathions in both solutions being the same, namely sodium. The fact then that a chemical reaction between the volatile substance and the nasal secretion must take place, before the sensation of smelling can be experienced, is hereby demonstrated. This observation, as noticed in the dissociation of sodium chloride and sodium nitrite, namely that metallic sodium can be noticed by the organ of smell, seems to indicate, if further similar experiments confirm it, that we can smell not only volatile substances, but also solids, provided they can be brought into a solution in the form of a salt. We can smell them when they are in the condition of dissociated ions. In the light of the dissociation theory this is easily explained; for we know that in all other physical and chemical properties these ions behave as if they were contained as gases in the solution, and the sodium is therefore in such a gaseous condition, and can be observed by the olfactory nerve. Now, by reversing the argument, beginning with the fact that only volatile substances can be smelled, we must conclude that the

same sodium as is here present in gaseous condition was shown by the observation of the same sensation in the two cases of sodium chloride and sodium nitrite, and we find a confirmation of the dissociation theory in an entirely unexpected field.

It can also be shown that the whole molecule of the volatile substances enters into this reaction. Let us take for instance oil of wintergreen or methyl salicylate. Its odor is marked and well known. That the salicylic acid does not produce the sensation is easily understood; for other salts of this acid fail to produce it. Nor does the action lie in the methyl group alone; for neither methyl alcohol, nor acetone, nor other methyl compounds, have the same odor. The complete molecule is, therefore, necessary. The disagreeable odor of valeric acid we all know; but only in its free state does it produce the peculiar sensation; for if combined with the radical amyl, its disagreeable odor at once changes to that one resembling apples, forming amyl valerianate or essence of apples. Even the position of certain groups in organic compounds will be noticed in this diminutive chemical laboratory; so, for instance, ortho-nitro-benzaldehyde ($C_6H_4(NO_2)CHO$) has a strong, penetrating odor, while its meta and para isomers have not. The substitution of a new group for a replaceable hydrogen also produces a new effect; for instance, protocatechuic acid ($C_6H_3(OH)_2CO_2H$) has only a faint odor, while its monomethyl derivative, vanillic acid, smells very strong. The secretion on the membrane in the nasal ducts acts, therefore, like a reagent, susceptible to hundreds of volatile substances, and producing a different reaction in each case. We can now understand why in a mixture of odors we are often able to recognize the one or the other, or even all of them; each vapor had its separate reaction, and produced its separate sensation. We can also understand why florists often mix flowers of different odors in order to produce the best effect; for instance, in bridal wreaths the orange flowers are mixed with gardenias, which by themselves do not smell pleasant; the two volatile substances emanating from the two flowers either decompose each other before entering the nostrils, or their separate action on the serum causes, by their blending, the desired agreeable sensation. We must also recognize perfumers as unconscious chemists performing the most intricate reactions, in order to produce a desired result.

We now also have a better explanation for the experiment described above, when a solution of a volatile substance is introduced into the nostrils. The first layer of this solution reacts with the serum; but as it is impossible for the glands in the membrane to now secrete water in order to wash off this finished product, on account of the pressure of the comparatively enormous amount of solution, no further reaction can take place and we cease to smell.

If now, in the light of these observations, we attempt a scientific classification of odors, we must at once reject all those odors which are pro-

duced by more than one single chemical reaction. The flower, plant or substance that exhales more than one fixed compound cannot produce a standard odor. The classification will not embrace such vague and indefinite terms as aromatic, balsamic, agreeable, disagreeable, etc., but be based on the reaction of definite chemical compounds.

When the distillation and separation of volatile oils was begun, it was at first supposed that each ethereal oil was a definite compound characteristic of a certain plant, and it took many years of patient and careful investigations to discover that most oils were mixtures of hydrocarbons, alcohols, aldehydes, acids and other compounds, the separation and classification of which opened a new field of chemical research. Thus it will also be with the classification of odors. It will require innumerable experiments to determine which reactions of volatile substances with the serum in the nasal cavities will produce fundamental odors, of which others are subdivisions. We may then hope to learn of what influence on the odor the chemical change of the volatile substance itself may be, for instance by forming additive or substitution products; we may discover what modification the various radicals of the fatty or aromatic series may bring about in the reaction, and we may be able to understand the influence of the various groupings of isomeric compounds. We have now learned that the terpene $C_{10}H_{16}$ can appear in many isomeric forms, some of the complicately constructed formulas having been discovered; we know that nearly each isomer has a different odor, a property which we are in the habit of considering of but little importance; but we may some day be able by retroarguments to determine intricate chemical formulas from the odor, to tell from it how many methyl groups there are and how they are arranged; and we may finally hope that from the nature of the various reactions and the similarity and difference of the nerve sensations we may discover the composition of this wonderful reagent, that allows us to perceive odors. Thus a new field of research is spread out before us for unlimited work, more difficult and intricate probably than anything that has ever been attempted before.

We can now but perceive its fascinating grandeur and diversity, and admiringly bow before the wonderful works of nature. For thousands of years man carried with him this diminutive chemical laboratory, every day he made use of its workings, he employed it in many different ways, he derived pleasure and benefit from its reactions—and yet it took many centuries to even discover its presence and understand the object of its existence.

THE CHAIR: It was not the idea of the committee in suggesting this topic for study and discussion that it would be possible at the present time to classify all the odors for the Pharmacopœia. The only question was whether it would be possible to introduce the beginning of an odor standard in the Pharmacopœia which would enable us to definitely ascertain and ascribe odors to some of the articles of the Pharmacopœia, that work

to be added to in the future as we may be able to do it. This comprehensive scheme set forth by Mr. Alpers has gone far beyond the expectations of the committee.

Without objection, the papers will be received and referred to the Publication Committee.

DR. BARTLEY: It strikes me that these papers have opened up a new field for study, but at the present time we must not lose sight of the fact that the individuality of the person will enter very largely into the impressions that one will get from tastes and odors and colors. We all know the difficulty we have in recognizing colors. Color-blindness is a well recognized factor; and when we come to carefully examine the children in the schools we find that the percentage of color-blindness is very considerable. And if you will take two individuals and place some colors before them, and ask them to describe them, you will find they will very often differ as to the shade; and all of us, in our own personal experience, have certain things—certain objects—that we refer colors to. Of course, it is an advantage to have these colors in the form presented here named for us, so we can begin a new experience and refer our descriptions to these particular colors. But you will find it very difficult to take one of these powdered drugs, as presented here on these cards, and refer it to an exact color, because in one case it is coarse and in another fine, and its texture will give it an entirely different appearance in the two cases. Just as in the metals: if we take a metal in a small piece it will have a brilliant lustre—bismuth, for example; it has a metallic lustre, but pulverize it, and it is black. The color depends a great deal upon the fineness of the powder in drugs. The same drug will present a different color and appearance, according to the fineness of pulverization. As to odors, one will describe an odor as pleasant, and another the same odor as disagreeable. Odors that are pleasant to me are often disagreeable to others. Almost everybody says hydrogen sulphide is disagreeable, but I do not object to it; I am accustomed to it, and it has rather an agreeable odor. The question of describing these odors is a very difficult one. One will say it represents one thing and another another. You must first educate the individual to recognize odors before this system of identification of drugs will be of any value. The same applies to tastes. We know there are professional tasters—such as tea-tasters and wine-tasters—who earn large salaries, many of them. But after a time these same men lose that taste, and then they are no longer of use in that capacity. The whole matter is one of the cultivation of the individual. It is a question of cultivation for a considerable time to recognize odors and colors accurately, and some persons are so constituted that they could never make a success of it.

THE CHAIR: The idea in taking up this study was not that we should say to people that a certain odor was agreeable, and another disagreeable, and still another aromatic. The idea is that the volatile oils are now being isolated one after another, so that it will now be possible to have these pure chemical substances used as standards. Now as to these colors, if the Pharmacopœia had a sheet of them in the front of the book, and the colors were numbered, then, in taking up a certain drug, we could say that its color is No. 20, say, or between 20 and 21. Prof. Diehl may have a different idea of the color of a drug from mine, and we may not describe it alike, and yet we might agree on one of these colors in the Pharmacopœia.

MR. OLDBERG: Undoubtedly color can be utilized to a very great extent. But I think I may say that a great many more people are odor-blind—if I may use the term—than color-blind.

THE CHAIR: I think it is practicable for the Association to publish these colors in the Proceedings.

MR. MAYO: I move that the Section recommend the Council to authorize the ex-

penditure by the Publication Committee of a sum not exceeding $100 for the publication of color-plates illustrating this paper of Prof. Kraemer.

The motion was seconded by Mr. Alpers and carried.

Mr. Kraemer now read his paper on the Valuation of Drugs, as follows:

THE VALUATION OF VEGETABLE DRUGS AND FOODS.

BY HENRY KRAEMER.

After the identification of a drug or food, the next question to be considered is its quality or value in a commercial sense. While the identification of drugs and foods is universally recognized as being of importance in handling them, yet it is also apparent that commercial success is dependent upon something more than this, *i. e.*, the intrinsic worth or value of the drug or food to the consumer. In times that have passed there was a kind of personal knowledge of drugs and foods which enabled one readily either by reason of appearance, odor, taste, or the sense of touch, to pronounce upon the value of them. As to whether our system of education is the cause of men not endeavoring to obtain this "personal knowledge" of drugs and foods, or whether these tests are not sufficient for the finer determinations of quality, or whether men have not the inclination to follow in the footsteps of their fathers, and patiently acquire this art for testing the products, we cannot say. Probably a combination of all these factors is at work producing the modern analysts.

Mr. Chas. H. La Wall,* in a paper on "Pharmacopœial Preparations from an Economical Standpoint," has shown in at least one instance how impracticable it is, financially speaking, for a pharmacist (compared to the manufacturer) to test his chemicals, preparations, etc. It is apparent that the Committee of Revision of the United States Pharmacopœia and other pharmacopœias appreciate the difficulties which attend the testing of chemicals and drugs purchased by the retail pharmacist, and very wisely have proceeded very slowly in introducing assay methods and tests which, though valuable and necessary to the manufacturer, may be but little, for economic and other reasons, employed by the retail druggist. The question arises: Is it possible for methods to be devised or accepted by the Revision Committee of the United States Pharmacopœia which can be employed practically by the pharmacist? Are there any methods for some of the more potent as well as other drugs, which he can employ quickly, or at the most without great expense, which will express to him their value? Is it possible to use smaller quantities and secure quantitative results that are as valuable as when larger amounts of the drug are employed? Are there not other methods besides those of chemical assay that may be employed with equally as good results? The writer is of

* Amer. Jour. Pharm., 1899, p. 64.

opinion that a large number of general principles may be laid down which can be worked out so as to make the subject of the valuation of vegetable drugs practicable, from an economical standpoint, to those who are properly qualified to dispense drugs, etc.

In the identification of drugs or foods certain characteristics are revealed, such as color, odor, appearance or impressions upon the sense of touch, which are of more or less qualitative value, indicating care in gathering and storing, preparation for the market, etc. For their quantitative valuation, however, other means that are much more complicated and laborious have been employed.

By the quantitative valuation of drugs and foods is ordinarily understood processes involving chemical assay. The advantages of, and objections to, this mode of the valuation of drugs are too well known for me to treat of them at this time. It must be said, however, that from here and there have come evidences that the valuation of some drugs is best ascertained by other means than by chemical assay. Dr. Squibb has recommended the physiological test for aconite and its preparations. Remington (Practice of Pharmacy, p. 1056,) says, under cantharides, that "The most satisfactory test of cantharidin is its vesicating property." Insect powders have by some experimenters been tested by placing a number of insects under the direct influence of the powder. A few years ago the author showed how, in some instances, as in the adulteration of cloves with pimenta, starch, etc., a quantitative microscopical method could be applied.

The question as to what is the quantitative value of vegetable drugs and foods is such an important one that the author has endeavored to broaden its scope, and to bring into co-operation all methods and tests that will in any way assist in the solution of the many problems connected with it.

The methods employed, or which are coming into use, may be conveniently grouped into five distinct classes, viz.:

I. Chemical Methods.
II. Physical Methods.
III. Microscopical Methods.
IV. Biological Methods.
V. Methods involving the use of the Polariscope and Spectroscope.

I. CHEMICAL METHODS.

For reasons which will be apparent later on, the author does not propose to consider the usual chemical assay methods. It may be stated, however, that he is fully aware of the value of the more or less definite and quantitative results which may be had by application of these methods in the examination of drugs. It may, moreover, be said that some of these methods, with the various modifications and improvements,

will undoubtedly continue to be employed. The question, nevertheless, suggests itself, cannot general methods be devised which may not only be performed quickly, but which will, compared to a standard, *i. e.*, the best quality of drug, give results which will have a certain commercial significance?

(*A*) It has been the attempt of the author, under these methods, to work upon the least quantity of drug necessary to obtain appreciable reactions or characteristic results. For instance, in looking at the various drugs containing tannin, the question may be asked: "Is it not as satisfactory to take 100 milligrammes (0.100 Gm.) of the drug and boil it for a few minutes with 20 Cc. of water and make a colorimetric test on this solution, using ammonio-ferric alum as a reagent, as it would be to make a solution of a larger quantity, and endeavor to obtain values either in terms of permanganate or by the hide method," etc.? Every one who has worked on the estimation of tannins must appreciate how unsatisfactory are the quantitative estimations as usually carried on.

By boiling the various drugs containing tannin (as quercus alba, geranium, kino, catechu, galla and krameria) with water, in the amounts suggested above and diluting, as necessary, after adding a few drops of a ammonio-ferric-alum solution, solutions are obtained which may be compared in color to a standard of given strength.

The following are the quantities used of the drugs mentioned above, and the results obtained therewith:

Take 0.100 Gm. of quercus alba, boil with 20 Cc. of water; filter, and when cool take 5 Cc. of the solution, dilute with 25 Cc. of water; add ammonio-ferric alum, and there is produced a faint greenish-brown color, and in the course of a few hours a precipitate of the same color results.

Take 0.100 Gm. of krameria, boil in the same manner with 20 Cc. of water; filter, and when cool take 5 Cc. of the solution, dilute with 160 Cc. of water; add ammonio-ferric alum, and there is produced a grayish-blue color, corresponding in intensity to the coloration produced with quercus alba. It should be noted that a dilution of over six times is necessary to produce the same intensity of color.

Using an analogous procedure with geranium, it is found if to 5 Cc. of the aqueous solution 180 Cc. are added, that, with a few drops of ammonio-ferric alum, a coloration of equal intensity to that of solutions of oak bark or krameria may be secured.

Five Cc. of the original solution of catechu requires to be diluted with 200 Cc. of water in order to produce, with ammonio-ferric alum, a solution of like intensity of color to solutions of the preceding drugs.

Kino requires that 300 Cc. of water be added to the 5 Cc. of solution of the drug to produce a corresponding intensity of color. Galls, on the other hand, require that to 5 Cc. of the original solution as many as 400

Cc. of water be added to obtain, with ammonio-ferric alum, a coloration that is equal in intensity to that of the solutions of the other drugs mentioned.

There is a slight difference in the color of the solutions obtained and a more marked difference in the color of the precipitates. Precipitates of oak bark, with ammonio-ferric alum, have a slightly greenish-brown color; those of geranium and galla have a light pinkish-blue color; those of catechu and kino are more or less grayish-blue or violet; and that of krameria has a slightly deeper gray color.

We find that the amount of water necessary to be added to 5 Cc. of the solution of the drug in order to produce solutions of equal intensity increases with the amount of tannin in the drug, as the following figures indicate:

Drug.	Per Cent. of Tannin. (Approximately.)	Number of Cc. of Water to be Added to 5 Cc. of Solution of Drug (each Cc. of which has .005 Gm. of Drug).
Quercus alba.	6–11 per cent.	25 Cc.
Krameria	20 "	160 "
Geranium	12–27 "	180 "
Catechu	35 "	200 "
Kino	50 "	300 "
Galla (Aleppo)	50–60 "	400 "

(*B*) Working on a similar basis, it is possible to get relatively approximate values with those drugs that contain oxymethylanthraquinone or some of its derivatives. In this case .100 Gm. of the drug is boiled for a few minutes with a solution containing 5 Cc. $\frac{N}{3}$ KOH solution + 15 Cc. H_2O. The amount of water that is required to be added to produce a light straw color is noted. In the following table is given a list of substances, the number of cubic centimeters of water required to be added to them to produce colors of nearly equal intensity, and the dose of the drug in grammes:

Drug.	Number of Cc. of Water Required to Produce a Light Straw-colored Solution with .100 Gm. of Drug + 20 Cc. of KOH Solution.	Dose.
Senna (Alexandria)	35 Cc.	4–8 Gm.
Senna (Tinnivelly)	35 "	4–8 "
Rheum	95 "	0.6–2 "
Frangula	115 "	1–2 "
Rhamnus Purshiana	115 "	0.6–4 "
Aloes	295 "	0.20–0.60 "
Aloin (Merck)	395 "	.03–.12 "

The shade of color is not pure yellow, but varies in the different drugs. With the sennas, the color is nearly pure yellow. The solutions of aloin and aloes are somewhat yellowish-green. Those of rheum and cascara sagrada are yellowish-purple. The solutions of frangula are still more purple.

It should be noted that, in comparing the above solutions with a solution of chrysophanic acid, the following proportions give a solution of about the same intensity as the drugs examined. To .025 Gm. of chrysophanic acid add 10 Cc. $\frac{N}{3}$ KOH solution + 15 Cc. water. To this solution 240 Cc. of water are added, when there results a light straw-colored liquid, resembling that of frangula rather closely.

It ought to be said, in presenting these results, that the idea has not been to carry the comparisons outside of the same class of drugs. It would appear, however, that it is possible to go even further, as we see in the above table that there is a direct ratio between the doses of the drugs and their colorimetric valuation; or we may say that the larger the dose required, the less the proportion of water necessary to produce a solution of equal intensity to other drugs of its class.

(*C*) In working with certain other drugs that contain coloring principles, we find that fairly accurate values may be obtained on comparing commercial specimens with material whose value, by reason of experiment or experience, we know something about. If we take, for instance, 0.100 Gm. of hæmatoxylon (logwood) and macerate it with 500 Cc. of water for a short time, it will assume a very slight purplish color. If we add to this solution a few drops of ammonia water, the solution becomes a cherry-red. Comparing this colored solution with that of other commercial specimens, differences in intensity are observable, which indicate the comparative value of the samples.

(*D*) In endeavoring to ascertain the value of a sample of crocus, carthamus or calendula, we find that light straw-colored liquids are produced on using 0.100 Gm. of any of these drugs and mixing them with certain proportions of water. 0.100 Gm. of calendula requires 15 Cc. of water, 0.100 Gm. of carthamus requires 100 Cc. of water, and 0.100 Gm. of crocus requires 500 Cc. of water to produce solutions of about the same intensity of color. We find, moreover, on taking 0.100 Gm. of each of these drugs and mixing it with 10 Cc. of alcohol, that the crocus alone is *immediately* colored, producing a solution the color of which is about equal in intensity to the aqueous solution already described. This is a rather quick method for getting approximate values of the commercial articles. It should be noted, as in the preceding cases (*A*) and (*B*), that the yellow color of the aqueous solutions is not of exactly the same shade with all three of the drugs. The yellow color is purest with crocus.

In calendula, there is a slight purplish tint, and in carthamus there is a shade of color between calendula and crocus.

(*E*) The most important field of operation, and the one which has the greatest promise in the direction already indicated, is with drugs that contain alkaloids or other active principles with which precipitates or colorimetric reactions may be obtained. Operating with quantities of drug varying from. 0.100 to 1.00 Gm., it is soon apparent that results are obtainable which may have as great a commercial significance as the results obtained by the more laborious and tedious methods usually followed by analysts and assayers. The number of specimens operated upon has not been as numerous as was desired, but probably sufficient work has been done to justify calling attention to the importance of another line of investigation of this most important subject of the valuation of drugs from a commercial standpoint.

It seems to the author that if the principles of chemical assay were reduced to their utmost simplicity, and that if the difficulties surrounding this subject from an economical standpoint were removed, few pharmacists would be unable to determine the value of their purchases.

It ought to be said, too, that this line of work suggested itself after several years of labor in endeavoring to secure results by a micro-chemical method upon the drugs themselves. This latter procedure I reluctantly give up for practical reasons for the present. There are so many other substances in the drug foreign to the principle or principles, the reactions of which are to be studied; and these, with microscopic conditions of heat, moisture, etc., cause an unsatisfactory condition of affairs, in that we have the appearance and disappearance of things, regarding the interpretation of which we cannot say anything definite as yet.

The object sought with the class of drugs here considered has been to ascertain the least quantity of drug which could be employed in making solutions which, with characteristic reagents, would give reactions that might have a commercial quantitative significance, and give methods which might be readily applied by the pharmacist. Before the matter is finally solved and put upon a satisfactory basis, a great amount of work must be done by different experimenters and observers upon each of the drugs where procedures as given are possible.

The following are the drugs that have been experimented upon:

(*a*) *Nux Vomica* (assaying 2.25 per cent. of total alkaloids.)—0.100 Gm. of the powdered drug is mixed with 10 Cc. of a modified Prollius Fluid and allowed to stand, with frequent agitation, from four to twenty-four hours.[1] The solution is then filtered into a small separatory funnel and

[1] Ether 60 Cc., alcohol 7.5 Cc, chloroform 30 Cc., ammonia 2.5 Cc. It should be borne in mind in this connection that probably a modified Prollius fluid does not extract all the alkaloids in the various drugs equally well.

5 Cc. of a dilute sulphuric acid (5 per cent.) added, and after separation of the aqueous solution the latter is diluted with 5 Cc. of water. This solution contains approximately 0.00225 Gm. of the alkaloids of nux vomica. Calculating 20 drops as being equivalent to 1 Cc., we have 20 × 10 Cc. = 200 drops. Then 200 drops of liquid contain approximately .00225 Gm. of alkaloids and 1 drop contains $\frac{1}{200}$ × .00225 = .000011125 Gm.

Two or three drops of this solution on a watch-crystal give with:

(1) Mayer's reagent, a pronounced white precipitate.

(2) $K_2Mn_2O_8+H_2SO_4$ a purple color that is evanescent.

(3) $K_2Cr_2O_7+H_2SO_4$ a purple color that is more persistent.

(4) Gold chloride solution gives a very slight yellow precipitate.

(*b*) *Guarana.*—1.000 Gm. of the finely powdered guarana is mixed with 10 Cc. of a modified Prollius Fluid and allowed to macerate from four to twenty-four hours. The solution is then filtered into a small separatory funnel and 5 Cc. of a dilute sulphuric acid (5 per cent.) solution are added. The aqueous solution is separated and a few drops of this latter solution containing the alkaloids give, with a tannin solution, a white precipitate which readily dissolves in excess of the reagent. A few drops of the solution, after neutralizing with ammonia, are evaporated nearly to dryness in a watch-crystal on a water-bath. A drop of HCl and a very small crystal (or better, a drop of a weak solution) of $KClO_3$ are added to this residue; this is again evaporated to dryness, and on exposing the dried and cooled residue to the fumes of NH_4OH, a faint opalescent blue color is produced. If, instead of employing HCl and $KClO_3$, as in the previous test, a few drops of bromine are added, the solution evaporated to dryness and the residue exposed to fumes of NH_4OH, a more pronounced bluish opalescent color is produced.

(*c*) *Ipecac* (containing 2.00 per cent. of alkaloids).—One Gm. of the powder is mixed with 10 Cc. of a modified Prollius Fluid and allowed to macerate, with frequent shaking of the bottle containing the mixture, from four to twenty-four hours. The solution is then filtered into a small separatory funnel and 5 Cc. of a dilute sulphuric acid solution (5 per cent.) are added. The latter solution containing the alkaloids is separated and 5 Cc. of water are added.

This solution (= 200 minims) contains approximately 0.02 Gm. of alkaloids. One minim contains 0.0001 Gm. of alkaloids. To a few drops of this solution the following reagents are added and the precipitates noted:

(1) Mayer's reagent gives a copious yellowish-white precipitate.

(2) $K_2Cr_2O_7$ solution gives a copious pumpkin-yellow precipitate.

(3) Picric acid produces a bright yellow precipitate.

(*d*) *Gelsemium* (containing 0.35 per cent. of alkaloids).—1.0 Gm. of

the finely powdered gelsemium is mixed with 10 Cc. of a modified Prollius Fluid and allowed to macerate from four to twenty-four hours. The solution is filtered and treated with 5 Cc. of a dilute sulphuric acid and 5 Cc. of H_2O, as in previous experiments. A few drops of this separated solution (1 drop = 0.0000175 Gm. alkaloids), containing the alkaloids, are treated with the following reagents, causing the reactions noted:

(1) Mayer's reagent produces an immediate yellow precipitate.

(2) Ammonium molybdate produces a blue-colored solution which becomes more marked in a few minutes and the color may last for a number of hours.

(3) Picric acid produces a slight yellowish precipitate.

(4) KI + I solution gives an orange-brown colored precipitate.

(*e*) *Opium* (containing 15 per cent. of morphine).—0.100 Gm. of powdered opium is mixed with about 3 to 5 Cc. of a modified Prollius Fluid; filtered and treated with 5 Cc. of a dilute sulphuric acid solution, as in the other drugs mentioned. The solution is nearly neutralized with 5 Cc. ammonia water (dil.). A few drops of this solution (1 drop = .000075 Gm. of morphine) give with (1) KI + I solution, a brownish-orange-colored precipitate, and with (2) Mayer's reagent, a yellow precipitate. (3) If a few drops of the solution are evaporated to dryness on a water-bath, and then a drop of HNO_3 added, a deep brownish-red color is produced.

(*f*) *Belladonna Leaves* (containing 0.40 per cent. of alkaloids).—One Gm. of the powdered belladonna leaves is digested with 10 Cc. of a modified Prollius Fluid, as in the other drugs already mentioned; the solution filtered and mixed with 5 Cc. of a dilute sulphuric acid solution and 5 Cc. of H_2O. The latter solution (1 drop = .000020 Gm. of alkaloids) containing the alkaloids is separated and a few drops are mixed on a watch-crystal with the following reagents, which give characteristic alkaloidal precipitates: (1) Mayer's reagent produces a pronounced whitish precipitate; (2) tannin solution gives a slight yellowish precipitate; (3) KI + I solution gives at first an orange-brown precipitate, which soon changes to a greenish color.

(*g*) *Strophanthus*.—One Gm. of ground strophanthus is mixed with 10 Cc. of a modified Prollius Fluid, and after maceration for from four to twenty-four hours, with frequent agitation, filtered into a separating funnel. To the filtered liquid 5 Cc. of a dilute H_2SO_4 (5 per cent.) solution are added. The aqueous solution containing the alkaloids is separated. If this solution does not clear rapidly another portion of ether, after its separation, may be added, when the remaining oil is removed. (1) A drop of this solution is placed on a watch-crystal with a drop of dilute ammonia water and then evaporated on a water-bath, giving a residue which is colored green immediately with H_2SO_4. The

green color is soon replaced by a brown coloration. Using two drops of the alkaloidal solution instead of one, a more marked and permanent green coloration is produced with H_2SO_4. (2) Mayer's reagent produces a slight white precipitate with a drop of the solution containing the alkaloid. (3) Tannin solution also gives readily a slight yellow precipitate. (4) I + KI solution produces an orange-brown precipitate.

(*h*) *Cinchona, Yellow* (containing 7 per cent. of total alkaloids, of which 3 per cent. is quinine).—One Gm. of the powder is macerated over night with 10 Cc. of a modified Prollius Fluid. The solution is filtered into a small separating funnel and 5 Cc. of a dilute H_2SO_4 (5 per cent.) solution are added. After agitation and allowing to stand until the two liquids separate, the aqueous solution containing the alkaloids is separated. This solution, which is slightly fluorescent, is rendered neutral with dilute ammonia water, and one drop contains about 0.00015 Gm. of quinine. (1) One drop of this solution is mixed with nine drops of water, and upon the addition of a drop of bromine water, followed by an excess of NH_4OH, the thalleioquin reaction readily takes place. (2) If one drop of the neutral solution be mixed with four drops of water, and a drop of bromine water, followed by a drop of potassium ferrocyanide, and then an excess of NH_4OH, a red coloration is immediately produced, which disappears shortly.

II. PHYSICAL TESTS.

There are certain physical tests which are no doubt of considerable value, and which may be readily applied with very little cost.

(*A*) In examining the galls (Aleppo) upon the market one finds a varying number from which the insect has emerged and others in which the grub or winged insect vary in the degree of development. In all of the cases where we have galls with a more or less empty central chamber, we find that they are rather light and not so rich in tannin as those not so affected. A rather careful examination of the better grades of commercial specimens of galls discloses the fact that in from 5 to 7 per cent. of the galls the insect has emerged, as indicated by the perforation. Upon opening the remaining 93 to 95 per cent. of galls, it is found that not more than from 10 to 12 per cent. are hollow and contain the large grubs or young winged insects. The remainder should be nearly solid throughout, and the appearance should be more or less grayish and crystalline, or at the most light yellowish and resinous in appearance. Galls answering to these characters will assay 50–60 per cent. of tannin.

(*B*) The specific gravity of at least some drugs has seemed to the author deserving of consideration in ascertaining their commercial value. Last year I was fortunate in setting a student of the Philadelphia College of Pharmacy, Alfred Heineberg, at work in determining the amount of resin in both resinous and starchy tubers of jalap, and also in determining,

among other things, the difference in specific gravity of the two kinds of tubers. The results of this work showed that the starchy tubers contained but 1.76 per cent. of resin and had an average specific gravity of 1.194. The resinous tubers of jalap assayed 6.62 per cent. of resin and showed a specific gravity of 1.360, and thus it was demonstrated that, in addition to the appearance of tubers of jalap, a quick method for determining the value of them lies in taking their specific gravity.

This was subsequently found not to be a new idea in getting at the valuation of tubers of jalap. H. Hager (Proceedings American Pharmaceutical Association, 1893, p. 120,) prepares a solution of common salt (having a specific gravity of 1.140 to 1.142) by dissolving 200 Gm. of table salt in 1,055 Gm. of water. The mixture is brought to a temperature of about 15°–17° C., and about fifty tubers are then immersed in this liquid. Not less than forty-five out of fifty tubers should sink in the liquid, and all that do not sink should be rejected, since good tubers have a specific gravity between 1.150 and 1.180. After examination, the tubers are put into a sieve, washed off with water and dried with a linen cloth. Dr. Hager furthermore thinks that the specific gravity of the salt solution might be increased to 1.150. It is rather interesting that the results of experiments carried on by Mr. Heineberg and those of Dr. Hager should so closely agree. The method of Hager is a simple one and deserving of attention from a practical standpoint, as chemical assays of a lot of jalap tubers represent the values of but a few tubers, unless the whole lot is in a ground or powdered condition.

The author has been desirous of applying this method of examination to rhubarb and inula, taraxacum and a number of other inulin-containing drugs, but want of time has prevented this work being done.

(*C*) *Absorbent Cotton.*—"In addition to the ordinary tests applied to determine the value of absorbent cotton, it has been proposed (Schweiz. Woch. Pharm., 1899, 20,) to test its elasticity by observing the weight required to compress a given weight of cotton into a definite space. A comparison has proven that the lower grades of absorbent cotton made from the sweepings, etc., have much less resiliency than has that of good quality made from the high-grade American cotton."

Equally important, however, is the measure of the length of fibres and the determination of the amount of oil adhering to them. For the latter test the cotton fibres are mounted in a saturated chloral solution, when the oil globules adhering to the fibres are manifested in the mount.

(*D*) The gelatinization test given by the United States Pharmacopœia under chondrus is worthy also of an extended application to all drugs containing gums or mucilages. The writer finds that the purity of powdered acacia may be readily ascertained on mixing 0.500 Gm. of the powder

[1] The tubers should be first broken in pieces before taking the specific gravity.

with about 10.7 minims of H_2O at about 30° C., when if the acacia is pure there will be produced shortly a clear mucilaginous mass. With dextrins, or a gum arabic containing dextrin, the resulting mass is either cloudy or less cohesive, or both.

III. MICROSCOPICAL METHODS.

The microscope may ofttimes be utilized when other methods of valuation fail. The microscope is an adjunct in determining the percentage value of foods and drugs, as in the cereals, spices, etc., when starchy materials are used to adulterate them. It does not appear necessary to dwell upon this work here, the author deeming it sufficient to refer to his previous communications on this subject as published in the Proceedings of the American Pharmaceutical Association and in the American Journal of Pharmacy, and also to a recent paper on "The Examination of Commercial Flour," in the Jour. Amer. Chem. Soc., August, 1899.

It ought to be mentioned, however, that this is a subject which, as shown by recent communications in this country as well as abroad, is receiving more and more attention (see Pharm. Review, Feb., 1899). Microscopical methods for the quantitative valuation of drugs may be divided into those (1) where no reagents are employed and (2) in which micro-chemical reactions are necessary.

Under Class I may be mentioned: (*a*) the determination of a foreign starchy adulterant in a drug; (*b*) the number of secretion cells, hairs or reservoirs containing oils, resins and other principles, as in rhizomes and leaves, etc., containing these products; (*c*) in determining the number of sclerenchymatic cells or fibres or other characteristic cells of an adulterant or admixture in a drug or food. This is particularly applicable in the study of the spices, some foods, as tea, coffee, cocoa, as well as in drugs.

No doubt upon further examination a very important relationship will be shown to exist between certain cell-contents and the active principles in drugs. It appears from the further investigations by Mr. Heineberg that there is a ratio in jalap between the percentage of resin and the number of starch grains and crystals of calcium oxalate. The following table gives the average number of crystals and starch grains found in a mount of 1 milligramme of powdered jalap. The per cent. of resin and specific gravity of the tubers in each lot had also been determined.

Sample.	Per Cent. of Resin.	Specific Gravity.	Crystals of Calcium Oxalate in 1 Milligramme.	Starch Grains in 1 Milligramme.
1	1.76	1.194	88	357
2	6.62	1.360	125	140
3	7.64	1.297	107	178

From these results it would appear that the microscopical method for determining the value of jalap would be as valuable as the method of specific gravity.

Probably the most important class of substances that require a microscopical examination in order to determine their value are the "compound powders," as pulvis glycyrrhizæ compositus, pulv. sarsaparillæ comp., and others for making fluid extracts and other pharmacopœial preparations. I recently met with a rather interesting case, which is worthy of mentioning here. In examining some compound licorice powder, which had been in a container on a shelf for about nine months, I found that there was an uneven distribution of the different substances that entered into it. I have reason to believe that they were originally well mixed, but that, upon standing in a building in a large city, in the streets of which traffic of teams, etc., causing jarrings or vibrations, was continuous, there was a fractional precipitation of the different substances entering into the powder, those which were heavier or smaller in size manifesting a tendency to form a lower stratum, and those tissues that were more fibrous and lighter remaining nearer the surface. This serves to indicate the importance of examining the compound powders that may be purchased, and also of shaking up the powders in the containers before using them.

(2) The use of the microscope, where micro-chemical reactions are to be employed, will, no doubt, be somewhat limited in the immediate future, owing to certain difficulties in technique in the work. There are a number of drugs, however, in which important data may be obtained by this means, as nux vomica, strophanthus, hydrastis, spigelia, crocus, etc.

(*a*) When *nux vomica* is sectioned and treated with a sulphuric acid solution containing $K_2Cr_2O_7$ or cerium hydroxide, a rose-colored reaction appears in the endosperm cells which contain the strychnine. The reaction is rather a slow one, owing to the thickness of the cell walls of the endosperm.

(*b*) *Strophanthus Seeds.*—Sections of the seed are put into concentrated H_2SO_4 (C. P.). Those containing strophanthin give a green color, apparently in the endosperm layer. It must be said, however, that in seeds in which some of the sugar compounds are present there results, with the albuminoids and nitrogen-containing compounds and the H_2SO_4, a rose or red or reddish-brown color. These color reactions sometimes obscure the green of the strophanthin.

(*c*) *Hydrastis.*—Sections of the rhizome, when put into concentrated H_2SO_4 (C. P.), give in the course of a few minutes a number of needle-shaped crystals of the alkaloids. These increase in number and size as the walls dissolve, and in the course of half an hour the mount is filled with yellow microscopic crystals.

(*d*) *Spigelia* may be readily distinguished from *phlox carolina* by the

fact that the numerous cells in the cortex of the latter contain crystals of calcium carbonate. The proportion of phlox in the spigelia may be determined by testing a sample of the drug which contains say about ten pieces of rhizome. If two of these give the micro-chemical reactions for calcium carbonate, then the amount of adulterant may be set down as being probably 20 to 25 per cent.

(*e*) *Crocus*.—In determining the value of a sample of crocus, one of the quickest ways is to sample the drug and take from 10 to 100 pieces and put them one by one on a slide containing concentrated H_2SO_4 (C. P.). The number which are colored blue in proportion to the others which are not colored blue represents the percentage of stigmas of crocus in the drug.

The following are the results of an examination of this kind made by Mr. William S. Weakley, a student of the Philadelphia College of Pharmacy, upon nine samples of commercial saffron :

Samples.	Number of Fragments Colored Blue by H_2SO_4.	Number Not Colored Blue with H_2SO_4.
1	90	10
2	68	32
3	86	14
4	78	22
5	82	18
6	—	26
7	88	12
8	48	52
9	46	54

(*f*) The study of micro-chemical reactions for alkaloids other than those already enumerated is attended with so much uncertainty that it cannot be said that they can be employed with any degree of satisfaction in the determination of quantitative values. I deem it far more expeditious in most cases, as in conium, cinchona, guarana, cloves, illicium, colchici cormis, opium, cocculus, oleum rosæ, amygdala amara, stramonii semen, etc., to exhaust small quantities of the drug with suitable solvents. Then in some cases from these solutions the active principles are removed by shaking out with water. Upon these aqueous solutions tests are then made with various reagents, the precipitates of which may be further examined microscopically. H. Behrens, in his "Anleitung zur Mikrochemischen Analyse," has shown that rather delicate separations may be effected by the different alkaloids in drugs. These separations, however, must be effected upon solutions of the alkaloids of the drugs, rather than upon the drugs themselves. This is a most interesting field for future work, and is one teeming with great possibilities. One of the recent papers on this subject is that by Zenetti (Pharm. Zeit., XLII., p. 752), in

which he has endeavored to differentiate the alkaloids by reason of the differences in crystalline structure of the precipitates obtained, these being examined by means of a microscope. His results are summed up as follows: *Strychnine* yields feathery crystals twisted into a sickle shape, sometimes into corkscrew-like combinations. *Brucine*, after two or more days, shows numerously branched formations, with small, shingled rods inserted at right angles on each branch. *Atropine* yields, after a day, numerously branched structures, the tips of the branches consisting of right-angled, thin, smooth plates, with smaller similar plates adherent. *Cocaine* gives rise in a day to the formation of glittering, golden tufts, consisting of acutely pointed needles. *Nicotine* yields a precipitate which almost invariably takes the form of small, sparsely branched rosettes, composed of rigid, unbranched arms, which frequently terminate in a point or long bristle.

IV. BIOLOGICAL METHODS.

By biological methods for estimating the value of drugs are meant those methods which involve the consideration of the degree of resistance manifested by the animals or plants upon which experiments are made, or to which the drugs are applied or administered. Chronologically considered, the biological methods were the first employed in ascertaining the value of commercial products.

The valuation of perfumes, spices, beverages of all kinds, etc., had been performed until very recently solely by the expert "testers," or those with cultivated senses of smell and taste. Adulteration and sophistication is carried on to such an extent to-day, however, that it is necessary in many instances to go a step further in determining the value of the class of foods and drugs originally valued by this kind of "specialist." It is well, however, to remember that even to-day many commercial products are valued according to the appearance, taste, odor and feel as pronounced upon by experts.

Biological methods for the valuation of drugs may conveniently be brought into the following main groups with their subdivisions:

I. Effect or Influence upon Plants:

(*A*) Depending upon the dormant vitality of the plant or drug.

(*B*) Depending upon physiological effect upon plants.

II. Effect or Influence upon Animals:

(*A*) Depending upon the perception or senses of the experimenter.

(*B*) Depending upon the physiological effects upon animals, and including:

(*a*) Effects on insects.

(*b*) Effects on lower animals, as frogs, rabbits, guinea-pigs, dogs, etc.

(*c*) Effects upon man.

(*1 A*) Beginning with the consideration of those drugs whose value seems to depend to some extent upon the vitality of the plant yielding them, we may mention seeds (including fruits) and fungi, as ergot. Unfortunately the author has been hindered considerably in this work for want of authentic material. But sufficient may be said to indicate that there is a relationship between the duration of vitality of plants and the active principles contained therein. A. Juckenach and R. Sendtner, in an exhaustive investigation upon fennel fruits from different localities, find that the value of fennel may be ascertained in three ways besides the extraction of the oil: (1) They find that upon placing the fruits in water those fruits which are richest in volatile oil retain their color and odor. (2) The value of the fruits may be readily ascertained also by means of a microscopical examination. (3) They further find that from 70 to 80 per cent. of the fruits are capable of germination.

At first thought we may be inclined to say that the germination tests of drugs would require so much time that they would be valueless. But let us consider one instance, viz., seeds of castor oil. We all know how birds and other animals eat the seeds of castor oil in the fall when they are discharged from the capsules. The taste at this time is only slightly different from other oil-containing seeds. The physiological effects of the oil are, however, manifest in both lower animals and man. The question whether the oil in 80 or 90 or even a higher per cent. of germinating seeds is bland and agreeable and yet possessed of all the purgative properties of the oil ordinarily sold would seem to be worthy of investigation. There is probably no other purgative of such great value, and one the taking of which is dreaded so much as this one, and it would seem that the oil in the seeds capable of germination is equally purgative but pleasant in taste, and that the disagreeable odor and taste are rather due to decomposition products formed in the seeds no longer possessing vitality. The writer may be able to do some work along this line this fall, but would appreciate very much if others also would take up this subject.

A study of some other seeds, such as mustard, might also disclose some interesting facts, which would not be lost in that they would certainly interest the plant physiologist. It was, however, in the investigation of ergot that the author was more especially concerned and interested. It is well known that in the drug ergot we have a "sclerotium" or resting stage of a plant. From this "sclerotium" there is produced in the spring a number of club-shaped sporocarps, in each of which are developed asci, containing six ascospores. It is these latter which attack the flowers of the rye in the summer, grow upon the nutriment contained therein, and produce with the harvest, in place of the grain, the "sclerotium" again, or what is known as the drug ergot. It has occurred to the author that one way of testing the authenticity of the year's crop of ergot would be to

place the "drug" under a moist chamber and grow it like other fungi in order to develop the next generation. The difficulty is to get the ergot fresh. I append a few letters from prominent firms to whom I applied a year ago for ergot of that year's crop.

"Your favor of November 11th is received, and we regret very much to reply that we cannot help you out in the way of samples of ergot. For the past two or possibly three years it has been very difficult to obtain fresh ergot, that is, of the year's crop then existing. This year we are having much more trouble than in the past, and two small lots we have already purchased for our next year's wants are of old crop and are somewhat wormy in parts. This we have to manipulate carefully by blowing the wormy parts out and sifting, and then put up in chloroform to secure it from further attacks by these little pests. We have no samples of either our present or past supply, for we grind it all up immediately after importing it in order to put it in the best condition for preserving in chloroform vapor in sealed packages, and then open each package when we make our fluid preparations from it."

"Replying to your favor of the 11th inst., we regret that we have thus far been unable to obtain any ergot which we were satisfied was this year's crop. We can obtain any quantity of the article which is claimed to be this year's gathering, but have no means of verifying the statement, and as a consequence are somewhat inclined to doubt its authenticity. We will, however, make an effort to secure for you the desired quantity of this year's crop as well as of that of two years ago."

I also wrote to Dr. Erwin F. Smith, the well-known pathologist of the United States Department of Agriculture, for material, and asked him to give me the results of his experience in regard to the vitality of ergot. The following is an excerpt from his letter:

"DEAR SIR:—I cannot tell you just at present where you can get ergot that will grow. Only rarely have I seen it in abundance. The last time it came under my observation was something like five or six years ago, growing on rye in South Michigan. I could have collected a pint of it then without any difficulty. I will remember your wish should I come across any next summer, or if any is sent in to the Division.

"My impression is that ergot will not grow after one or two years. I have tried a number of times to get ergot six months to two years old to form the mature fruits, but have never succeeded, although with fresh material this ought not to be difficult."

This is as far as I have been able to go with this investigation; but the facts recorded, however, would seem to point to the inference that one test for good ergot would be that depending upon its germinating qualities, *i. e.*, producing the sporocarp of the next generation.

(*I B*) A most interesting field of operation in determining the value of

drugs is opened up through the investigations of the botanists of the University of Wisconsin on the toxic action of various chemicals upon plants. The several papers by True, Kahlenberg, Hunkel and Heald, in the Bot. Gaz., Pharm. Review and Bot. Centralbl., are all deserving of careful study. We may say in a general way that "compounds which have a toxic effect upon animals are generally poisonous to plants, although we find different degrees of sensibility to the same compound in both plants and animals."

In analyzing the osmotic and toxic properties of different substances, True [1] compares them with cane sugar, proceeding as follows:

Different strengths of solution of cane sugar are made up, based on the molecular weight of the substance in the requisite number of liters required to give the concentration desired. He places spirogyra filaments for twenty-four hours in these solutions of different strengths and notes the strongest solution in which they will survive. This strength solution is termed by him the *boundary concentration, and is regarded as a measure of the purely osmotic action capable of being sustained by spirogyra.* Having determined this point, he calculates, by use of methods in no way involving the living cell, the concentration of the solutions of other substances studied, which have an osmotic value equal to that of the experimental boundary concentration of cane sugar.

The results of experiments of this kind on different substances would indicate that (1) "if the algæ survived in a concentration greater than that calculated from the value of cane sugar, the conclusion would necessarily follow that the substance in question was less harmful to plants than sugar. This condition of things was in no case realized. (2) If the algæ first survived in the calculated concentration, the action of the substance would be purely osmotic and equal to that of cane sugar. (3) If the algæ should first survive in a concentration more dilute than the calculated boundary concentration, the substance in question would be more harmful than sugar."

"In the realization of the third case, injury by one or both of two possible methods might be wrought: (1) By a very rapid extraction of water from the cell, violence might be done to the protoplasm through the lack of opportunity for the organism to accommodate itself to the change; (2) Toxic action, due to the chemical interference of the substance in solution with the molecules of living substance, might also take place. In each special case it would be necessary to ascertain the kind of injury operating. In doing this certain plain considerations should be borne in mind. Should spirogyra be found to survive at a concentration greater than that causing plasmolysis and less than the calculated boundary, the deleterious action would in greater probability be due to the osmotic properties of the solution. If, however, the algæ should die in a concentra-

[1] *Bot. Gaz.*, 1898, p. 408.

tion less in osmotic value than the cell-sap, *i. e.*, at a concentration weaker than the plasmolyzing strength, death could hardly be attributed to the water-extracting properties of the molecules or ions." [1]

In the course of studies by Kahlenberg and True, using sodium salts of a number of acids, mainly organic, the boundary concentrations for spirogyra were obtained. A wide range of variation was found. In but one instance did a salt give a boundary concentration greater than 0.04 Gm. molecule per liter (sodium hippurate, 0.08 Gm. molecule per liter), and in a number of cases the algæ did not survive until a solution containing but 1 Gm. molecule in 200 liters was reached, viz., sodium cinnamate and sodium protocatechuate. In no case does it appear probable that osmotic action plays any noticeable rôle in bringing about the death of the plants; in all cases, therefore, practically toxic action only can be involved as the cause of death.

In addition to the experiments upon algæ, Kahlenberg and True [2] have used germinating seeds of *Lupinus albus*, and Heald [3] has further worked with seeds of *Pisum sativum*, *Zea Mays* and *Cucurbita Pepo*. For details of the manner of study see Heald's paper. Sufficient is it to say that the roots of the germinating seeds, when about 20 millimeters long, are marked at a distance of 15 millimeters from the top by means of a fine brush and India ink. They are then held in perforations in a cork so that the root is immersed in the liquid of desired concentration and substance. Growth is allowed to take place in the seedlings in a dark chamber with a nearly uniform temperature (21 to 23° C.). At the end of twenty-four hours the seedlings are removed and measured again. The roots are also examined for other symptoms of poisoning, besides the retardation or inhibition of growth. They are then replaced for another twenty-four hours, when measurements are again made.

The solutions of the various concentrations of different substances produce varying results. In the more concentrated solutions growth may not take place at all. In the more dilute solutions growth may be very rapid. In some cases there is a diminution in size of the root.

These writers have experimented with a large number of inorganic substances, and recently True and Hunkel [4] have extended this method of

[1] "The boundary concentration of cane sugar, the osmotic value of cane sugar and that of the substance in question being given, the boundary concentration would be found to be related to that for cane sugar inversely as the known osmotic values, according to the proportion

$$S : x :: ox : oS,$$

in which S is the boundary solution of cane sugar, x the boundary solution of the substance, ox the osmotic value of the substance, and oS the osmotic value of cane sugar.

[2] *Bot. Gaz*, 1896, p. 81.

[3] *Bot. Gaz.*, 1896, 125.

[4] *Bot. Centralbl.*, No. 1898, 48-51.

study to that class of organic bodies known as phenols. They experimented with germinating seeds of lupinus albus and spirogyra with the following substances:

Phenol: phenol + 1NaOH; pyrocatechol; resorcinol; resorcinol + 1 NaOH; hydroquinone; pyrogallol; phloroglucin; ortho-cresol; ortho-cresol + 1NaOH; meta-cresol; meta-cresol + 1NaOH; para-cresol; para-cresol + 1NaOH; carvacrol; carvacrol + 1NaOH; thymol; thymol + 1NaOH; orcinol; ortho-nitrophenol; ortho-nitrophenol + 1NaOH; para-nitrophenol; para-nitrophenol + 1NaOH; nitrobenzene; tri-nitrophenol (picric acid); sodium picrate; anisol; guaiacol; ortho-oxy-benzoic acid; sodium salicylate; methyl salicylate.

As a result of their work they found that, "except in isolated instances, electrolytic dissociation plays but a very subordinate rôle in determining the toxic properties of substances. Picric and salicylic acids strongly dissociate and become powerfully poisonous, by virtue of the H ions, in great measure. Pyrogallol and, probably, methyl salicylate, first undergo other molecular changes, after which their products dissociate electrolytically. Here the H ions may account for much of the toxic action. In the cresols and mono-nitrophenols, electrolytic dissociation seems to exert a pronounced influence. Some phenols are comparatively weak in this integrity, but quickly change to substances containing constituents even more fatal than H ions. Pyrocatechol, and especially hydroquinone, are of this class.

"Certain radicles seem to have specific properties when introduced into the molecule, modifying the toxic value. The number of hydroxyl groups (OH) present seem to have little influence on the toxic action of the phenols, as in the series benzophenol (OH), resorcinol (2OH) and phloroglucin (3OH). The introduction of the methyl group (CH_3) into the benzene nucleus increases the toxicity to a considerable but rather variable degree, as in the cresols, less plainly in orcinol. The introduction of the isopropyl group [$—CH(CH_3)_2$] into the cresols increases the toxic value of these substances, as carvacrol and thymol. The presence of one or more nitro groups (NO_2) increases the toxic action to a great degree; mono- and tri-nitrophenols. An increase in the number of the NO_2 groups present does not seem to increase the toxic action. When the H of an (OH) group is replaced by a (CH_3) group, little influence seems to be exerted on the toxic action, *e. g.*, anisol and guaiacol. The carboxyl group (COOH) brings with it a degree of toxicity corresponding directly to the degree of dissociation and the number of H ions it affords; salicylic acid."

It is apparent, from this brief review of some of the more important points of the work on the application of the theory of the dissociation of electrolytes to explain the toxic action of various substances on living

organisms, that it has not only an important scientific interest, but one which is likely to yield in a practical manner some very important results. For instance, Kahlenberg and True recognized from the beginning the adequacy of this theory to explain the action of antiseptics, and later Paul and Kroenig[1] verified these views. Certain plants, however, show a marked sensitiveness to certain substances; for instance, spirogyra is far more sensitive to the heavy metals, but is more tolerant towards acids than the seeds of lupinus albus. On the other hand, spirogyra is less sensitive towards phenols than are lupines.

It seems to the writer not at all unlikely but that we have here in the possible application of the work of True and others a field with unusual opportunities for study of the indirect valuation of some of our potent drugs.

(*II A*) The valuation of drugs by means of methods which call into play the senses of the investigator has the objection that the personal element is a variable one. Nevertheless, methods of this kind are still employed upon many commercial products, and have a certain value in their ready or quick valuation. While these methods, as applied heretofore, have been more or less crude, it does not seem at all unlikely but that the time may come when certain departments of physiology and physics will contribute to our more intimate knowledge of substances and their effects upon the senses. This may be illustrated in noting the taste, odor, touch and color of the substance or its solution in some instances.

The author made some experiments to determine the least amount of substance which, when treated with a proper menstruum, would give the characteristic taste or odor of the drug employed.

(1) The following are the drugs upon which experiments were made to ascertain the weakest solution, a few drops of which would still give the characteristic taste:

(*a*) *Nux Vomica* (containing 2.25 per cent. of alkaloids).—0.100 Gm. of finely powdered nux vomica is shaken in the course of several hours with 500 Cc. of water. 10 Cc. of this solution are diluted with 90 Cc. of water, and a few cubic centimeters still possess appreciably the characteristic taste of nux vomica. One Cc. of this solution is calculated to contain 0.0000045 Gm. of the alkaloids.

(*b*) *Cinchona* (containing 7 per cent. of total alkaloids, of which 3 per cent. is quinine).—0.500 Gm. of the powder is mixed with 500 Cc. of water as above, etc. Ten Cc. of this solution are diluted with 50 Cc. of water, a few cubic centimeters are found to still give the characteristic taste of the alkaloids of cinchona. One Cc. of this solution contains .000005 Gm. of quinine, or about .000011 Gm. of total alkaloids.

[1] *Zeitschr. f. physik. Chemie*, 1896, p. 414.

(*c*) *Aconite Root* (containing 0.50 per cent. of aconitine).—0.500 Gm. of the finely powdered aconite is mixed with 500 Cc. of water and shaken occasionally during the course of five minutes. A few cubic centimeters of the filtered solution, if swallowed, produce a distinct and characteristic sensation in the throat.

(*d*) *Gentian Root.*—0.500 Gm. of the finely powdered drug is shaken with 500 Cc. of water for a few hours. Ten Cc. of the filtered solution are diluted with 10 Cc. of water. A few cubic centimeters of this solution give the characteristic taste of gentian.

(*e*) *Calumba.*—The solutions of this drug correspond essentially to gentian, imparting, however, the characteristic taste of calumba.

(2) A very appreciable difference in the quality of some drugs containing volatile oils is manifest on treating 0.100 Gm. of the drug with 1 Cc. of deodorized alcohol and noting the odor produced by a small quantity dropped on a piece of filter paper. In this manner the superiority of Penang to Zanzibar cloves is at once discerned. The differences in the odor of solutions of the cinnamons is probably even more marked.

On mixing 0.100 Gm. of black mustard in a porcelain capsule with sufficient water to moisten it, there is immediately developed a pronounced and persistent odor of the volatile oil of mustard.

(3) The sense of touch is employed by millers to some extent, but probably has more value as a qualitative test. Brokers who deal in cereals, however, use the sense of touch in the "doughing test," which is employed in determining the value of commercial flours.

(4) In regard to the employment of color as a test, it may be said that certain drugs and foods develop characteristic colors when moistened with water or alcohol or upon treatment with chemicals, as, for example, in the latter instance, the action of iodine and phloroglucin. The intensity of the colors produced is, in a measure, of quantitative as well as qualitative value.

(*II B*) We now come to consider what promises to be one of the most important problems involved in the valuation of drugs, viz., that of pharmacological assay. For our purposes the work may be divided into a number of classes, depending upon the class of organisms that are affected. The following subdivisions may be made: (1) effects upon micro-organisms; (2) effects upon insects; (3) effects upon lower animals, as eggs of sea-urchins, fish, guinea-pigs, rabbits, dogs, etc.; (4) effects upon man.

(1) The study of the action of drugs upon micro-organisms, and the study of the products produced by these organisms, belongs to bacteriology and pathology. Both of these branches may be looked upon as departments of biology. The antiseptic or germicidal effect of different substances upon harmful organisms is one of the most important subjects, from a practical standpoint, that may be considered. The study of the

toxalbumins or proteid poisons of various micro-organisms, as well as of many higher animals, as snakes, spiders, etc., has opened up a particularly inviting field during the past ten years. The work of True and others, already referred to, has done much to clear up the mystery surrounding this subject, and we hope that the practical application of the work of these authors may be fully appreciated. By experiments of the nature proposed it would appear that the question can be satisfactorily answered, what is the least amount of antiseptic or antidote that is necessary to produce the neutralization of the poison or death of the organism producing the poison, taking into consideration, of course, the least cost of the drug?

(2) The valuation of insect powder has been attempted in a number of ways, depending upon amount of ash, color and per cent. of extract, microscopical characters, direct effect upon flies and other insects.

Probably the most satisfactory method is to take about 0.250 Gm. of the powder, place it in a small homeopathic vial, and subject an insect (say a fly) to its influence. The latter should be paralyzed in one minute and killed in about two or three minutes. Other insects, as cockroaches, beetles, etc., manifest more resistance to its effects, and may not be killed, according to J. R. Hill, for fifty or sixty hours. It is interesting to note from the experiments of J. M. Francis that much valuable substance may be lost unless experiments of this kind are carried out. He found, upon experimenting with three different powders: (1) made from the flowers only; (2) made from the stems only; (3) made from an equal mixture of flowers and stems, that when these powders were sprinkled or blown, by means of the "powder gun," on flies and other insects in traps, or on dogs infested with fleas, there was seemingly no difference in the rapidity of action or toxicity of that made from flowers and that made from both flowers and stems. The powder made from stems alone, however, appeared a little weaker, but even this showed a surprising activity.

These results point again to the fact that in practice what is desired is an insecticidal powder that will simply do the work, and that the application of a powder that is stronger than is required means the wasting of that much material. No other means of testing powders and other substances possessing insecticidal properties is probably so valuable and so simple as that of subjecting insects directly to their action.

(3) The study of the effects of drugs upon the lower animals has been performed for a great many years. Frogs, rabbits, guinea-pigs, dogs, etc., have been experimented upon, and more or less valuable results have been obtained. The results of the experimental investigators have not always agreed with those of the clinician. It is but natural, however, that differences should arise between these two classes of observers. The reason for this is, as Dr. Cushny (in "Text-book of Pharmacology and Therapeutics," 1899, p. 18,) says: "Doubtless there are often faults on both sides.

The scientist sometimes insists too strongly on deductions drawn from a limited number of animal experiments, and refuses to admit results which have been obtained in thousands of cases of disease by competent observers. On the other hand, the therapeutist often lays too little weight on the general principles governing the interaction of the drug and the organism. Both often exceed the limits of their provinces, the scientist in refusing to admit effects of which he has perforce but a small experience, the clinician in attempting to refute the deductions founded on experiments which he has no opportunity of verifying." "Fortunately for the progress of medicine and pharmacology, the scientific clinician is imbued with a desire to ascertain the methods in which drugs act, as well as to cure disease, and thus unites clinical observation with pharmacological research. It is to be anticipated that the results of the practical physician and of the experimental investigator will come into more complete accord as more exact methods of clinical research are used by the former and a wider laboratory experience is attained by the latter. But both methods are necessary for a complete knowledge of the action of a drug. Animal experiments cannot be dispensed with, for only thus can the action of drugs be ascertained in detail and expeditiously, and at the present time, when a new remedy appears almost every week, it is impossible to await the verdict of the clinics to separate the useful from the worthless, even if it were permissible to apply to the human subject drugs of unknown action and potency."

The words of Cushny, coming, as they do, from a physician, have necessarily considerable weight, and point to the conclusion that in many instances the effects of drugs may be most satisfactorily ascertained by laboratory experiments upon the lower animals. That qualitative results are obtained in this manner is not to be doubted. The question seems to be, are quantitative results which are of value likely to be obtained? From the experiments of True upon plants and of Loeb upon eggs of sea-urchins, fishes and other lower animals, we see no reason why approximate quantitative values of drugs and their preparations cannot be obtained. Even though the results may not represent all that is to be desired, we cannot but believe that they are of far more value in at least certain drugs than any other value of the drug that may be given.

There are a number of drugs, viz., ergot, ipecac, physostigma, strophanthus, digitalis, belladonna, rhamnus purshiana, etc., whose efficiency may be probably best determined by studying their effects upon lower animals. The values obtained by this means mean more to the practitioner, and will dispel more or less of the uncertainty that attaches to the administration of these drugs or their preparations.

It is well known that the ophthalmologist has pharmacological values for the different mydriatics and myotics. In response to a request to Dr.

Wendell Reber, of Philadelphia, for the relative potency of the different substances which affect the pupil of the eye, I received the following:

The smallest quantities in solution of these substances that will affect the pupil are: Homatropine hydrobromide, gr. $\frac{1}{30000}$; eserine sulphate, gr. $\frac{1}{100000}$; atropine sulphate, gr. $\frac{1}{1500000}$; and hyoscyamine hydrochloride, gr. $\frac{1}{1000000}$. Taking homatropine as the unit, the relative strengths of the mydriatics and myotics appear to be:

Pilocarpine	¼
Eserine	6
Atropine	30
Hyoscyamine	75

Dr. Reber also informed me that the anæsthetic effects of the different anæsthetics were being calculated or measured by an anæsthesiometer. Surely we must bear in mind that the world is not standing still, and that the old physiology and physiological methods, based on theories which have not been satisfactorily demonstrated, are giving gradually way to the newer methods of research based on the results and experience of recent years.

We need not wonder that there are many who do not as yet comprehend the importance of biological assay, for it must be borne in mind that this subject is still in its infancy, and that it is only within the past few years that it has received any consideration at the hands of experimental physiologists.

(4) The results of the clinician represent those of experiment upon man in health and disease. It may be said that the experience of the ages has come down to us, each race and tribe contributing something of value. The Indian of Peru has taught us the value of cinchona and coca. The Hottentots, from their experience, found out the value of buchu, and examples of this kind can be multiplied. As new localities are explored, new drugs and foods are discovered which have been employed by the native inhabitants. Many more, however, are the discoveries of the present day in the laboratory of the chemist of either new constituents in plants or new synthetics created by his synthesis from other materials. The value of these new medicaments, however, is now first ascertained upon some of the lower animals, and it may be that experiments upon plants will show that some of this work, in at least determining the toxicity of the new compounds, may be satisfactorily done upon either germinating seeds or upon algæ.

V. OPTICAL METHODS.

The valuation of some drugs, and the products obtained from them, by means of the microscope, spectroscope and polariscope is well known. We have already, in a previous portion of this paper, referred to the value

of the microscope for this purpose. We may add, however, that not only are the spectroscope and polariscope valuable adjuncts in the examination of drugs, foods and preparations, but the micro-polariscope and micro-spectroscope each reveal certain characteristics which are deserving of greater attention than they have heretofore received. A mere mention is made of these facts at this time, and will be dwelt upon more fully in a subsequent paper.

CONCLUSION.

From this rather broad consideration of this subject, the value of which can only be confirmed in some instances by the experiments of future investigations and by the experiments of a number of workers, it is apparent that the valuation of the various medicinal substances is dependent upon a large number of very different methods, involving a knowledge of many branches of science.

I am very well aware that some of the methods proposed will have to be worked over very carefully before they can be adopted with any degree of authority. But it was considered desirable to bring this subject to a focus in this manner so that an opportunity might be afforded all of us to work along lines that would bring to light methods for the valuation of drugs which, while involving the highest skill and training on the one hand, would on the other hand be inexpensive and practicable to the retail pharmacist. It seems to the author that each drug has properties or constituents which will make it possible for it to be valued in one of the four general classes of methods proposed, viz.: (1) Chemical; (2) physical; (3) biological; (4) optical.

Each of these methods will be shown to have its limitations, and in some cases several or all methods may be advantageously employed.

There are, no doubt, numerous imperfections in this paper; but if, on the basis of the experiments already carried out by the author and other investigators, and as suggested in this paper, methods may be at least devised which will have a practical value to the retail druggist in approximately estimating the value of his purchases of vegetable drugs, the work upon the paper will not have been in vain.

The reading of the paper was greeted with decided applause.

Dr. Houghton then read the following paper, and was heartily applauded.

IS PHYSIOLOGICAL ACTION REQUISITE AS A DEPARTMENT OF PHARMACEUTICAL RESEARCH?

BY E. M. HOUGHTON, M. D.

If by the query as propounded by the committee on Scientific Papers it is intended to express the idea that in order to accomplish results of the greatest value to the pharmaceutical and medical professions and to

humanity at large, through the manufacture of better and more uniform pharmaceutical products from old and tried drugs, through the improvement of processes for the isolation of active constituents, or through the exhaustive investigation of the action of new medicinal substances, by the employment of physiologic methods in addition to the methods usually employed in pharmaceutical research, I desire to offer the following views, some of which were expressed several years ago. (The Journal of Am. Med. Assn., Apr. 3, 1897.)

In the practice of medicine it is of paramount importance that the remedies prescribed shall exhibit their special pharmacologic properties, and that such action shall be as nearly uniform as possible; otherwise the greatest harm may result to the patient through valuable time lost or improper dosage. One of the most humiliating charges against the science of medicine is the one so frequently voiced that "The application of drugs in the treatment of disease is at best uncertain and unscientific." It is because the great imperfections in the present methods of treating disease are realized by scientific men that such great efforts are being put forth throughout the civilized world, by the application of every conceivable method, to improve pharmaceuticals and to discover the relations that exist between the physiologic action of the body in its normal condition (physiology), and the changes in function of the various organs manifested when under the influence of drugs (pharmacology), or when modified by the products or processes of disease (pathology), in order that medicinal agents may be applied with the greatest certainty of effect. As a direct result of these efforts, and especially because of the application of laboratory methods, the progress of pharmacy and medicine has been greater during the last twenty-five years than in the entire century preceding.

Chemical methods should always be employed in preference to animal experiments where possible; but there is a large class of drugs containing active constituents, about which little is known, or which are of such a delicate nature that decomposition results when they are subjected to chemical manipulations, consequently it is impossible to standardize them by ordinary means. I refer to Indian cannabis, ergot, and especially to the heart tonics of the digitalis group, etc. No directions are given in the United States Pharmacopœia for the assay of these substances, yet the most poisonous drugs employed in therapeutics belong to the digitalis series. As given by several of the best authorities, the maximum dose of belladonna is twice as great as that of digitalis, while ten times as much absolute HCN can be given with safety as of strophanthin.

Brunton found by experiments upon animals that amyl nitrite dilates the arterioles and lowers blood pressure, and recommended the drug in angina pectoris: his recommendation, as is well known, has been confirmed by abundant clinical experience. Through the exhaustive re-

searches of Schmiedeberg and others, the rational application of digitalis and the rest of the heart tonics has been rendered possible.

We must give the biological laboratory entire credit for explaining the cause of the infectious diseases, and for the revelation of nature's remedy and the perfection of processes for manufacturing the antitoxins. This is the most important discovery in medicine ever made, and bids fair to revolutionize the treatment of many diseases that have heretofore defied the power of all drugs. It is not my purpose, however, to speak at length of the relation of the pharmacist to the antitoxins, as my time is too short; but it seems to me that more attention should be paid by pharmacists to these products, which are so rapidly supplanting older remedies.

Too often in the manufacture of pharmaceuticals physiological activity has been sacrificed to enhance the elegance or lessen the cost of the preparation. Podwissotsky and Dragendorff concluded from insufficient experimental data that sclerotinic acid was the most desirable constituent of ergot, and, since it is readily soluble in water, numerous manufacturers made aqueous preparations of the drug. After several years of pharmacologic study of ergot, I am satisfied that Kobert, Jacobi, etc., are right in their conclusion that sclerotinic acid as an oxytoxic is worthless; large doses of it and of certain preparations of ergot, made with an aqueous menstruum, and therefore containing it, may be administered to pregnant animals without producing abortion, or to fowls without producing blackening or gangrene of the comb or other peripheral parts. It is a well established fact that ergot may become quickly inert if improperly cured or stored. Indeed, if physiologic examination be made of the supplies of ergot offered for sale on the market, it will be found that a large proportion is comparatively inert.

Pharmacologic experiments are of special importance in the isolation of active glucosides. "Several years ago there was isolated a beautiful white scillein, which was supposed to be the active constituent of squill. But since then it has been found to be entirely inert, and that the really important constituent of squill is a brown resin-like substance possessing in a marked degree the characteristic action of the digitalis group."

The various samples of strophanthin, digitalin, and other glucosides found on the market vary greatly in strength; indeed, so considerable is the discrepancy that the employment of these drugs in tablets by weight may become decidedly dangerous. Of three samples of supposedly chemically pure strophanthin which I tested, in 1897, and reported in "The Journal of the American Medical Association," "There was found such wide variation in activity that one was ninety times as fatal to animals as another. The strength of the remaining two varied between the above limits. No two samples were even approximately the same in strength. What a chance for a sudden fatal termination of an apparently improving heart-case!"

It is a well known fact that the supplies of crude Indian cannabis,

strophanthus seeds, etc., shipped to this country may possess full activity or be almost inert, resulting consequently in much variation in the finished products. From personal observation in testing several hundred samples of crude hemp, I find that at least 60 per cent. of the drug obtainable should be condemned. Is it any wonder that physicians have come to believe that cannabis is the most unreliable of drugs? I have frequently found one tincture of strophanthus three times as active as another. Verily, the practitioner's path is full of pitfalls when he attempts to prescribe drugs of this class!

By physiologic methods, since many of these drugs have an almost specific action on certain organs of the animal body, it is a comparatively easy matter to standardize the crude drug, pharmaceutical preparations or active constituents, before they are placed on the market in the form of fluid extract, pills, tablets, etc., and thus avoid unnecessary danger to patients. I believe the time will come when the attitude of physicians will be such that manufacturers of these medicines will be compelled to purchase physiologically assayed drugs, or assay their finished products by physiologic means.

Synthetic chemistry has made such rapid progress during the past few years that scarcely a day passes without our attention being called to some new antiseptic, antipyretic, hypnotic, etc. I believe the introduction of these substances will result in great benefit to the entire profession of medicine, but before a new product is employed for clinical purposes its physiologic action should be carefully studied in the laboratory. Not until the functional changes produced by the drug on each individual organ have been worked out as thoroughly as possible, can a rational application of the remedy be made.

"The examination of medicinal plants for active constituents is greatly facilitated by physiologic testing of the residues obtained by chemical manipulations. We are unable to say whether a substance crystallizing in an alcoholic extract of a plant is the active constituent of that plant, or whether the amorphous substance dissolved by ether is the principle sought, but we can tell by physiologic methods when we have a substance representing the activities of the crude drug, whether it be crystalline or amorphous—which is the fact of real importance to the physician."

"Heretofore it has been the custom of manufacturing houses, when dealing with a new plant believed to possess medicinal properties of value, to make a fluid extract or some other preparation of the crude drug, and send it out to clinicians, at great expense, in the hope that it might prove of value. How much better it is to have the physiologic properties of the plant examined at the outset. If found to be inactive, the drug may be rejected, thus saving a large item of expense to the manufacturer and much disappointment to the physician and his patient; while if the plant is of value and the physician knows what its effects are on the various

organs of the body, he can use it intelligently, with a good prospect of success. Then, too, human beings are not so recklessly experimented upon, the lives of a few animals being jeopardized in place of so many patients. We can never analyze the action of a drug on the various organs of the human body with such precision as we can on the lower animals; but clinical knowledge obtained after we have a right conception of the physiologic action of the agent used is of very great importance in determining the value of a given remedy." J. Am. Med. Assn., April 3, 1897.)

Until recently most of the work in experimental pharmacology has been carried out in Europe. A few of the better universities of America have equipped laboratories for the investigation of the physiologic action of drugs, and for purposes of instruction. No American or foreign educational institution, so far as I am aware, has given attention to the qualitative or quantitative assay of drugs by physiologic methods, notwithstanding the vast amount of valuable research work they have accomplished.

It seemed to me, five years ago, when considering the advisability of establishing a pharmacologic laboratory in connection with a manufacturing plant, that an extremely important field of work was being neglected, and that by careful and painstaking study, methods could be devised whereby the danger of prescribing powerful remedies unamenable to chemical assay could be avoided. Such work requires much time and ample laboratory facilities, but success can be accomplished, as evidenced by the fact that all the diphtheria antitoxin on the market is standardized by experiments on animals. Other illustrations might be cited if time permitted.

In conclusion, I believe that advances may be made in pharmacy by the application of physiologic methods, since such methods, when employed in connection with chemical manipulations, enable us to standardize potent drugs, not amenable to chemical assay, improve processes of pharmaceutical manufacture, aid in the isolation of active constituents, help to a clearer knowledge of the action of drugs long employed in practice, and promote the advancement of medical science by furnishing exact knowledge as to the action of new substances before they are employed clinically, and thereby serve the cause of humanity.

On motion of Dr. Bartley, the Section adjourned to 3 o'clock this afternoon, with the understanding that discussion of the two papers just read should be had at the afternoon session.

Third Session—Wednesday Afternoon, September 6, 1899.

The Section was called to order at 3 o'clock, p. m., by Chairman Rusby.

The Secretary read the minutes of the second session, which, there being no objection, the chair stated would stand approved as read.

The Chair called attention to the fact that the report of the Committee

of Research had been postponed at the morning session, and would be read now. Prof. Prescott thereupon read the report, as follows:

REPORT OF THE SPECIAL COMMITTEE OF RESEARCH.

To the Section on Scientific Papers, American Pharmaceutical Association:

The Special Committee of Research begs leave to make its Fourth Annual Report.*

In its organization this is a special committee, not a standing committee. The specific purpose of its organization is not, however, so much a temporary service as it is an experimental method of co-operation for work as unending as time itself. The organization of a special Research Committee within the Section of Science, and additional to its regular standing committees, was proposed by the retiring Chairman of the Section, at Denver, in 1895, and then authorized by the Section, which took further action at Montreal in 1896. So this committee has been in an experimental stage of organization. After a careful review of the situation it is the conclusion of the committee that its separate organization in this Association is justified in the interests of co-operative research. This justification, however, has not been realized in the measure of the ideal before us when the committee was organized. A greater degree of unification of several investigations in several branches of science is desired. And to this end the committee will now address themselves anew.

An individual conceives and carries on a single research within a single branch of learning. He joins to himself another, or he draws upon a succession of younger workers or advanced students, for investigations along the given line of the limited subject. If a chemist, he gets some minor task done by a physicist or a biologist; if a botanist, he gets or tries to get the analyses of a chemist; if a pharmacist, he calls commonly in vain for the help of the pharmacologist. In the line of the question before him, where does any investigator find help? Where does he find the several parts of his work to have been already taken in hand? Where does he find the facts which constitute his point of departure? Where but through the scattered reports of research in a century of journals and in three or four or more languages? The literature of his subject is an ever-present and seemingly burdensome factor in the investigation. He must co-ordinate his labor at every step with scattered workers of the past and present, reached only through the literature of the subject.

Therefore, to supply the literature of any subject in the research of every member of this special Committee has been from the first accepted as an obvious service for this Committee. Systematic preparation of bibliographies of some of the subjects most pressing in their demands has been prepared, as far as support has been provided for the task.

In the previous reports of this Committee the Chairman has presented an enumeration of the published contributions of each member within the year, giving descriptive titles and places of publication, with some account of the subjects of research in hand by each member, but not yet completed. The Chairman has again asked from each one in the Committee, and from a few others associated with these, a list of their publications and subjects of work for the year, and these reports are herewith appended, with notices by the Chairman, for convenience of reference, to show the subjects of work of the members of the Committee and their associates, disclaiming any special value to these selections.

The Chairman begs to report that the terms of membership of Messrs. Kremers and Lyons in this Committee now expire, and he wishes to place their names in nomination for re-election.†

* Previous Reports are published in Proc. Am. Pharm. Assocn., Montreal, 1896, p. 128; Minnetonka, 1897, p. 172; Baltimore, 1898, p. 431.

† At the third session, the Section elected these nominees.

The Committee, upon due consideration of the work for the coming year, beg to ask the power to enlarge their number. *

The Chairman announces that the Committee have elected Dr. A. B. Lyons as their Chairman from and after the present meeting of the Association.

CHARLES RICE,
HENRY H. RUSBY,
JOHN URI LLOYD,
EDWARD KREMERS,
ALBERT B. LYONS,
ALFRED R. L. DOHME,
ALBERT B. PRESCOTT, *Chairman.*

Dr. John Uri Lloyd has in progress, approaching completion, the important bibliographic work, "References to Capillarity," described last year. The present impetus given by physical chemistry will increase the demand for this work, when it shall appear, and its bearing upon operative pharmacy is such that it will be of large service in the work of the Association. Dr. Lloyd has not given titles of his briefer articles of the year.

Dr. Edward Kremers' articles have been as follows:

I. PUBLISHED REPORTS.

1. † Molecular Dissociation of Nitroso Compounds. By E. Kremers. Ph. Archives, p. 102.

2. † The Menthol Group: Menthene and its Nitroso-Chloride and Nitrosate. By W. O. Richtmann, Martha M. James and J. A. Anderson. Ph. Archives, 1, pp. 107 and 117.

3. Amyl Nitrite and its Assay. By R. Fischer and J. A. Anderson. Proc. A. Ph. A., 46, p. 413, Ph. Archives, p. 189.

4. The Assay of Spirit of Nitrous Ether. By R. Fischer and J. A. Anderson. Ph. Archives, i, pp. 161 and 169.

5. Notes on two Oils Containing Pulegone: 1. Mentha Canadensis. By Florence M. Gage; 2. Pycnanthemum lanceolatum. By F. W. Alden. Pharm. Rev. 16, pp. 412 and 414.

6. Caryophyllene Derivatives: True and Bis-Nitroso Addition Products. By O. Schreiner and Charlotte F. James. Ph. Archives, 1, p. 209.

7. Note on the Crystallography of a Reduction Product of ◁¹ terpene 3-one. By W. H. Hobbs. Ph. Archives, 2, p. 21.

8. On the Chemical Composition of Monarda Oils. By E. Kremers. Ph. Archives, 1, p. 73.

9. On the Assay of Carvone Containing Oils. By F. W. Alden and S. Nolte. Ph. Archives, 2.

II. PAPERS IN COURSE OF PREPARATION.

On the Nitroso Addition Products of Sesquiterpenes. By O. Schreiner. (Will be ready for Put-in-Bay meeting.)

Bibliography of Spirit of Ethyl Nitrite, and Ethyl Nitrite. By W. O. Richtmann and J. A. Anderson. (Part is already in type.)

Bibliography of Amyl Nitrite. By W. O. Richtmann.

The Menthol Group: a review and bibliography. By W. O. Richtmann.

*This request was granted in the action of the Section, in the third session, and the Committee have invited Prof. Henry H. Rusby to continue his services as a member of this Committee.

† 1 and 2 were not enumerated in last year's report.

The Assay of Thymol and Carvacrol and the Influence Exerted by an Excess of Iodine. The work of the previous year has been extended by W. S. Ferris.

The Assay of Oils Containing Carvone. Additional work by O. Schreiner, F. W. Alden and G. Ehlert.

Oil of Cloves and Oil of Bay. Additional observations have been made by W. S. Ferris.

III. Preliminary Work.

The incomplete manuscripts on methyl salicylate and benzolhydroxycyanide mentioned last year, have not yet been re-edited for report on account of lack of time. Some work additional to that reported above has been done on monarda oils, on commercial turpentine oils, on the yield of menthene and pinene nitrosochlorides, on the action of light in the formation of these nitrosochlorides and their decomposition, etc., etc., has been done during the past year. A beginning has also been made to compile a list of qualitative tests for the more common constitutents of volatile oils, with special reference to those that serve as adulterants. In addition to this mere compilation, a critical study of some of the methods and of the literature bearing on these methods is being made.

Dr. A. B. Lyons' work for the past year has been devoted first to the new edition of his "Manual of Pharmaceutical Assaying," first issued in 1886. This book has been recast and rewritten so that it is practically a new treatise. It is of immediate importance to pharmacists, and especially to the Committee of Revision and Publication of the United States Pharmacopœia at this time. It is compact and clear, the product of experience in assaying, and is governed by a good judgment of what is practicable for analysts whose time is limited.

Dr. Lyons has in preparation another work, a book of botanical synonyms to cover all the more important of our indigenous plants, as well as all plants employed in Europe and America, medicinally. The aim is to give the correct botanical names with such synonyms as are still in use by botanists, and the most apparent popular names, with as full a list of popular synonyms as possible.

Dr. Henry H. Rusby has contributed as follows:

1. Bull. Tor. Bot. Club, 26; 139 to 146 and 189 to 200.—An enumeration of the plants collected by Dr. H. H. Rusby in South America—Gentianaceæ to Solanaceæ, inclusive, with 27 new species.

2. Morphology and Histology of Plants, a botanical text-book, now going through the press.

Works now in progress:

1. The remainder of the enumeration named above is ready for publication, and only awaits space in the Bulletin for printing.

2. An Enumeration of the Plants Collected in Bolivia by Miguel Bang, Nos. 1,765 to 3,000, with several hundred new species, and many new genera, is ready for publication, and only awaits space in the Memoirs of the Torr. Bot. Club.

3. Work is progressing on my Report on the Plants Collected by Dr. H. H. Rusby upon the Lower Orinoco.

4. Work is begun on a large collection of 3,000 species collected in the Santa Martha region of United States of Columbia, by Herbert H. Smith. This will be a work of unusual interest to medicine and pharmacy, because of the richness of the region in medi cinal plants, and because of its historical connection with medical botany.

5. I believe that my work in organizing the Economic Museum of the New York Botanical Garden on the system adopted, should rank as a distinctly scientific enterprise.

6. Work has been continued in accumulating material for research work on powdered vegetable drugs.

The publications of Dr. Dohme are as follows:

1. Articles published this year:
   The Chemistry of Aloes.
   The Chemistry of Digitalis.
   Common Drugs made Synthetically.
2. Work in hand or about to be published:
   Examination of essential oils of the market.
   Is synthetic oil of wintergreen inferior in any way to the natural oil?
   A comparative study of the alkaloidal value of English and German or Hungarian narcotic herbs.
   A comparative study of the alkaloidal value of spring-dug and fall-dug Golden Seal Root, as well as of the rhizomes and rootlets of the same drug.
   A comparative study of Rio and Carthagena Ipecac Root as to content of total alkaloids, as well as relative amounts of cephæline and emetine.

The Revision of the Vegetable Materia Medica.

Dr. Dohme further suggests that a systematic study of the vegetable drugs of the Pharmacopœia as to their therapeutic value would be of great value to the physician and pharmacist as well. There are many drugs in the United States Pharmacopœia, and more in common use not in the United States Pharmacopœia, that are unquestionably valueless to medicine and should be eliminated. To do this they must be studied chemically, and especially pharmacologically, and if this Committee could co-operate with a committee of the American Medical Association, the desired result could be achieved. It is further believed that work in the establishment of active principle standards of the United States Pharmacopœia drugs should be studied, as may be possible, namely, aconite, aloes, male fern, belladonna root and leaf, columbo, cannabis indica, capsicum, coca, colchicum root or seed, conium, convallaria, digitalis, ergot, frangula, gelsemium, pomegranate, guarana, hops, golden seal, henbane, ipecac, jalap, matico, nux vomica, oil anise, oil cassia, oil coriander, oil eucalyptus, oil lemon, oil peppermint, oil savin, oil rose, oil santal, oil sassafras, Calabar bean, pilocarpus, podophyllum, wild cherry, rhamnus pursh., rhubarb, sanguinaria, stavesacre, stramonium leaf and seed, strophanthus, veratrum viride, zingiber.

Of the works of the Chairman in the past year, the principal publications are given in the titles and references in his two papers on pages 261 and 271 of the present volume. He has also written the chapter upon Alkaloids in the forthcoming volume entitled "American Text-book of Toxicology."

Of the work of those associated with members of this Committee, the following is a partial list:

By C. H. Briggs and A. M. Clover, working under the direction of Prof. P. C. Freer,—A chemical examination of Saw Palmetto.—Ph. Archives, 1899.

By C. G. Hunkel and A. B. Stevens, a contribution to the Chemistry of Rhubarb. Upon this work Mr. Hunkel has been engaged with Prof. Stevens for a full year, and the results will shortly be presented for publication.

The Structure and Development of the Seed of Gossypium Herbaceum (Illustrated). By Mr. A. Van Zwaluwenburg, with Prof. J. O. Schlotterbeck. Ready for publication.

The Structure and Development of the Seed of Theobroma Cacao. (Illustrated). A. Van Zwaluwenburg and J. O. Schlotterbeck.

Examination of the Leaf of the Ilex Vomitoria for Caffeine and Tannin. (Illustrated). H. C. Hewitt and J. O. Schlotterbeck.

Examination of Two Varieties of Ceylon Bush Tea for Caffeine. H. C. Hewitt.

An Investigation as to the Presence of an Alkaloid in Taraxacum. Published in this volume. By Mr. Van Zwaluwenburg and Dr. M. Gomberg.

Thanks are due the house of Merck & Co., for the gift of a number of the alkaloids in quantities needed for this work.

On motion of Mr. Ryan, the report was ordered to be received and referred for publication.

THE CHAIR: It is in order now to proceed to the election of two members of this committee. It is highly desirable, owing to the nature of this research work, that the committee should not be changed any more than necessary, and I think the gentlemen nominated in the report should be elected.

Dr. Whelpley accordingly moved that the Secretary cast an affirmative ballot electing Dr. Lyons and Prof. Kremers members of the committee, and the motion was seconded by Mr. Ryan and carried. The Secretary announced that the ballot had been cast and the gentlemen named were elected.

MR. PRESCOTT: Power was given the committee last year to fill vacancies in its own numbers. The committee desire to request this additional power, that they be authorized to enlarge their own number, in their discretion. I think this ought to be done for the advantage it may be to the work, and I beg leave to move that this Special Committee of Research be authorized to add to its number as it may find it necessary or desirable.

The motion was seconded by Mr. Hallberg and carried.

MR. PRESCOTT: Anticipating that Dr. Lyons would be re-elected as a member of the committee, the committee has already chosen him as chairman for the coming year. So on the work of the committee you will please address Dr. A. B. Lyons, Detroit.

THE CHAIR: According to the understanding upon adjournment this morning, the discussion of the two papers read just before adjournment was to be taken up the first thing this afternoon; but a request has been made that two papers coming from the Research Committee should first be presented, as the gentleman who will present them wants to leave on the boat. Without objection, therefore, we will proceed to the reading of these two papers, the first being on Further Work upon the Estimation of Alkaloids and the Assay of Alkaloidal Drugs, by H. M. Gordin and A. B. Prescott, and the second on Directions for Certain Alkaloidal Assays, by the same gentlemen.

Leave being granted, Dr. Prescott took the floor and read the first-named paper:

FURTHER WORK UPON THE ESTIMATION OF ALKALOIDS AND THE ASSAY OF ALKALOIDAL DRUGS.

BY H. M. GORDIN AND A. B. PRESCOTT.*

In a paper presented by us a year ago,† we offered a method for the volumetric estimation of alkaloids by use of standard solution of iodine. We then reported upon the method for use with six alkaloids, morphine,

* In the work of Research Committee D., Section 2, Committee of Revision and Publication of the Pharmacopœia of the United States, 1890–1900.

† "Certain Alkaloidal Periodides and the Volumetric Estimation of Alkaloids as Higher Periodides." A. B. Prescott and H. M. Gordin, Proc. Am. Phar. Assoc., 1898, p. 355.

atropine, strychnine, brucine, caffeine, and aconitine. And we had succeeded in making the method a trustworthy and convenient one for five of these alkaloids,* all those just named except aconitine. In each instance we had obtained in purity the higher periodide of the alkaloid, the one formed in our method of estimation, and had found the analysis of this periodide to give a molecular factor which was closely verified when put to the volumetric test. A volumetric method of course requires that the alkaloid be first brought into aqueous solution, nearly free from other matters. In the case of opium we had reported a method of extraction from the crude drug, together with the volumetric estimation of the morphine, in one assay process, having advantages of a nearer approach to complete recovery of the morphine content, and of promptness of operation. As to methods of extraction for other crude drugs, we mentioned a year ago that we had work in hand, and said that it was too early, as yet, to make definite proposals for pharmacopœial adoption of the method for any of the alkaloidal drugs or galenicals.

During the past year we have worked upon the application of the iodometric method to five more alkaloids, emetine, hydrastine, berberine, colchicine, and quinine, and have already made the method entirely satisfactory for emetine, berberine and hydrastine. For berberine the estimation, though iodometric in one sense, rests on the formation of an insoluble hydriodide instead of a periodide, and requires volumetric solutions different from those used with all the other alkaloids. We have also elaborated the volumetric process to the separation of strychnine from brucine. In the case of colchicine, the formation of a uniform periodide presented difficulties, but we hope to return to the investigation of this alkaloid, as well as to that of aconitine. Respecting quinine, we have in hand work upon its separation, but we are not confident of making any improvement over existing methods.

To work out a general method of analytical extraction of alkaloids from crude drugs, bringing the alkaloids of drugs completely into solution suitable for almost any volumetric or gravimetric estimation, has been a problem undertaken in our work during the past year. We were invited to this problem, in fact, by the unexpected advantages of the procedure we had adopted for extraction in opium assay, and by a desire to adapt the same procedure to other and ordinary alkaloidal drugs. The opium assay process we have materially improved this year. In result we now desire to offer such a method for the extraction of alkaloids in process of estimation, especially for use in volumetric estimation, whether such volumetric way be on the iodometric plan, or upon the alkalimetric plan, the latter having received a quite favorable consideration at the hands of analysts.

* For caffeine the method had been completed, with analysis of the periodide and other perhalides, by Gomberg, in this Laboratory, in 1896.

In this paper we beg leave to give some further experimental data, upon which we have based the methods which we propose for alkaloidal assay, and therewith very brief discussion of the claims of these methods in comparison with others.

In an accompanying paper we give, in short compass, the bare directions for assay, namely, for alkaloidal extraction in general, for iodometric estimation in general, with a list of iodine factors for alkaloids, the assay of nux vomica, of ipecacuanha, and opium.

We give the simple directions for assays, disencumbered by reports of our experimental work, for the easier use of analysts while under the working pressure of industrial laboratories, where all devices for the valuation of drugs ought, if possible, to come to trial before adoption into the text of a national pharmacopœia. But whether for consideration by any national committee of revision, or for the attention of individual chemists anywhere, it is our desire to give, if we can, some addition to the resources of analysts, well knowing how portentous are the demands now made, both by legal enactments and by commercial contracts, upon the faithful services of the devoted analyst, who is not seldom called upon to do without delay more than all the world of research has ever done before him.

THE PERIODIDES OF EMETINE.*

Emetine seems to form two periodides, according to whether the iodine is added to the alkaloid or *vice versa*, but owing to lack of material we have only isolated and analyzed one, namely, the higher periodide. The emetine used was obtained from Merck & Co. The periodide was made by pouring 200 Cc. of a solution of emetine in acidulated water, this solution containing about half a per cent. of the alkaloid, into about 500 Cc. of a solution which contained about one per cent. of iodine with one and five-tenths per cent. of potassium iodide, and was strongly acidulated by hydrochloric acid. The mixture was shaken till the supernatant liquid became perfectly transparent, the precipitate was separated by means of the pump, quickly washed with cold water and then dried, first on porous plates and then in vacuo over sulphuric acid.

Thus obtained, the periodide is a dark-brown powder, hardly soluble in benzol, ether, or chloroform, quite soluble in alcohol, and very soluble in a mixture of four parts of alcohol and one of chloroform. The chloroform greatly increases the solubility of the periodide in alcohol, though chloroform alone hardly dissolves it. So far we have not been able to recrystallize it. On evaporation of the solvent a viscous mass is generally left. Authorities differ with regard to the formula of emetine as follows:

* Included in a paper published in Pharm. Review, vol. 17. (1899).

Lefort and Wurtz,* ..... $C_{28}H_{40}N_2O_5 = 482.98$
Glenard,† ..... $C_{30}H_{44}N_2O_4 = 494.96$
Kunz,‡ ..... $C_{30}H_{40}N_2O_5 = 506.92$
Paul and Cownly,§ ..... $C_{15}H_{22}NO_2 = 247.48$

Our periodide corresponds best to the formula of Lefort and Wurtz. Adopting that, provisionally, we have an emetine hydriodide heptiodide, $C_{28}H_{40}N_2O_5.HI.I_7$.

For the estimation of the additive iodine the periodide was dissolved in chloroform mixed with alcohol and titrated with standardized thiosulphate, using starch as indicator. It is best to add first an excess of the thiosulphate solution, then add considerable water, when the excess is titrated back with standardized iodine. For the total iodine the periodide is dissolved in a little chloroform mixed with a few drops of alcohol: powdered zinc is then added and the mixture kept on a water-bath till effervesence (from the action of zinc on the chloroform) ceases. To the mixture, when cold, ammonia water is added, and the iodine in the zinc and ammonium iodide is estimated exactly as described in the analysis of morphine tetraiodide.‖

For additive iodine, 0.1492 Gm. of the periodide gave 0.0880045 Gm. iodine, and 0.122 Gm. gave 0.0727250 Gm. iodine.

	Calculated for $C_{28}H_{40}N_2O_5.HI.I_7$.	Found.
1	59.24	59.98
2	59.24	59.61

For total iodine, 0.1313 Gm. of the periodide gave 0.0890502 Gm. iodine, and 0.12095 Gm. gave 0.0818797 Gm. iodine.

	Calculated for $C_{28}H_{40}N_2O_5.HI.I_7$.	Found.
1	67.69	67.82
2	67.69	67.69

From these results we draw the provisional iodine factor of the alkaloids of ipecacuanha, 1.00 of iodine = 0.55 of alkaloids.

PERIODIDES OF HYDRASTINE.¶

The higher periodide is of a very dark brown color, very difficultly soluble in ether, benzol, or cold chloroform, more easily in hot chloroform

* Ann. Chim. Phys., (5), 12, 247.

† Ibid., (5), 8, 233.

‡ Arch. d. Pharm., 225 (1887), 461; 232 (1894), 466.

§ Pharm. J., (3), 24, 61.

‖ Proc. Am. Pharm. Assoc., 1898, p. 340, *et. seq.*

¶ This body was reported upon in full in an article in Am. Jour. Phar., 71, 257, (1899.)

and in alcohol, and very easily in a mixture of alcohol and chloroform, or alcohol and ether. It melts in hot water. Attempts to crystallize it failed. It is obtained when the dilute alkaloid solution is slowly added to a large excess of iodine dissolved with potassium iodide in water. So made, it is constant of composition, hydrastine hydriodide pentaiodide, as determined by a preparation and analysis as described in previous papers.*

	Calculated for $C_{21}H_{21}NO_6HI.I_5$.	Found. I.	II.
Additive iodine	55.43	55.30	55.34
Total iodine	66.52	66.86	66.06

The lower periodide of hydrastine, formed when the iodine solution is added to the alkaloidal salt solution, is from light brown to dark brown in color. It is not constant in composition, and was only obtained as an approach to a triodide. Prepared and analyzed it gave figures as follows:

	Calculated for $C_{21}H_{21}NO_6HI.I_2$.	Found. I.	II.	III.	IV.
Additive iodine	33.22	35.76	36.07	36.33	36.02
Total iodine	49.83	50.01	49.74		

IODOMETRIC ESTIMATION OF HYDRASTINE.†

The exclusive formation of the hexiodide is insured by slowly adding a weak alkaloidal solution to a large excess of the iodine solution, and proceeding as directed for other iodometric estimations.‡ The iodine factor for hydrastine is 0.60403 (382.14 : 5 x 126.53 :: 0.60403 : 1). This factor was verified in the estimation of solutions of 0.3 per cent. and of 0.15 per cent. of hydrastine.

ASSAY OF HYDRASTIS.

Ten Gm. of the finely powdered hydrastis are rubbed up to a paste with a few cubic centimeters of a mixture of alcohol, and stronger ammonia, each, 5 Cc., and ether, 30 Cc., in an 8-ounce screw-top ointment jar, and a few cubic centimeters more of the same mixture are then added, so as to have the powder well covered with liquid. The small pestle is then left inside, and the jar, well covered, is set aside over night. The jar is then opened, put into a good current of air till the odor of ammonia has disappeared, and then in a vacuum over sulphuric acid for about five or six hours. The powder is then put into a filter-paper cell, placed in a Soxhlet extraction apparatus, the jar rinsed out several times with powdered glass, or, in the

*Proc. Amer. Phar. Assoc., 1898, pp. 358, 364.

† We are indebted to Prof. John U. Lloyd for a specially prepared sample of hydrastine. We had also a sample in a lot of pure alkaloids furnished by Merck & Co., and the latter agreed very well with the former in the quantitative results.

‡ See an accompanying paper, "Directions for Alkaloidal Assays."

absence of this, with coarsely powdered barium nitrate, the rinsings added to the Soxhlet, the latter connected with an Erlenmeyer flask containing about 40 or 50 Cc. absolute ether, and the extraction conducted in the usual way, till a few drops after evaporation of the ether and acidulation give no reaction with Mayer's or Wagner's reagent. The ethereal extract will be found to have only a very slight yellow color. The Erlenmeyer is then detached from the Soxhlet, the ether poured out into a flat evaporating dish, the Erlenmeyer washed out several times with water containing about 2 per cent. sulphuric acid, the washings added to the contents of the evaporating dish, and the latter put into a draught at about 30° C., till the ether has disappeared.

The contents of the dish are poured into a 100 Cc. flask, the dish washed, the washings added in the flask, and the latter filled up to the 100 Cc. mark. The solution containing hydrastine sulphate, and of which 10 Cc. represent 1 Gm. of the root, is used for the estimation of hydrastine.

For the iodometric estimation 20 Cc. of the filtered solution (representing 2 Gm. of the drug), are run from a burette into a 100 Cc. flask, containing 20 or 30 Cc. of a standardized solution of iodine of any known strength (that in the neighborhood of 1 per cent. is the best), and the analysis carried out exactly as described in the accompanying paper. From the amount of iodine consumed the amount of hydrastine is deduced by using the factor of the hydrastine hexiodide, *i. e.*, 0.60403 of hydrastine for one of iodine consumed.

For a gravimetric estimation another portion of 20 Cc. of the filtered solution is run into a separator and the hydrastine shaken out with benzol and ammonia, all the coloring matter remaining in the aqueous fluid, and a perfectly colorless solution of hydrastine in benzol is obtained. The benzol solution is then filtered through a small filter into another separator, the first separator and filter washed with benzol, and the hydrastine again shaken out with water acidulated with sulphuric acid. At last, from the watery solution, the hydrastine is shaken out with ether and ammonia, the ether poured into a tared beaker and slowly evaporated in a dark place. After drying in a vacuum over sulphuric acid and paraffin, the beaker is weighed. The hydrastine is left in perfectly white crystals, and only a slightly yellowish tint can be seen on the sides of the beaker. This tint is probably due to traces of canadine, which becomes yellow* on exposure to light. Of course, instead of shaking out, the method of perforation may be used if preferred.

For the estimation of berberine a current of dry air is passed through the Soxhlet till all the ether is removed, the Soxhlet connected with an Erlenmeyer containing 40 or 50 Cc. of alcohol, and the extraction continued till the alcohol comes out colorless. The alcoholic extract, contain-

* E. Schmidt, 1894; Arch. d. Pharm., 232, 141.

ing berberine and considerable quantities of extractive matter, is poured out into an evaporating dish, the Erlenmeyer washed out with hot water and a little dilute acetic acid, the washings added to the evaporating dish, and the latter kept on a water-bath, adding water from time to time till all the alcohol has disappeared. A little more diluted acetic acid is now added, the dish covered, and when completely cold its contents are filtered into an Erlenmeyer having the capacity of about 300 or 400 Cc.*

Six to eight Cc. of acetone are added to the contents of the Erlenmeyer, of which the washings of the dish and the filter have been added, and then a 10 per cent. solution of sodium hydrate is added, drop by drop, till the precipitate first formed ceases to disappear on shaking, and the liquid acquires a strongly alkaline reaction. The Erlenmeyer is then stoppered and shaken in circular direction for about ten or fifteen minutes, and then set aside in a cool place for two or three hours. The berberine-acetone † separates out in crystals, some of which adhere to the sides of the vessel. The supernatant liquid is then poured on a small filter, the precipitate washed once or twice by decantation, and then on the filter, till the washings are colorless. The filter is then pierced through, and, by means of the wash bottle, the precipitate is returned to the same Erlenmeyer in which the precipitate took place. In this way all loss is avoided. To the precipitate about 4 or 5 Cc. of a five per cent. solution of sulphuric acid is now added, and then water enough to make about 100 or 200 Cc. The Erlenmeyer is now put into hot water, when the precipitate will completely dissolve in the course of a few minutes. The solution is now poured into a long-necked flask, washing the Erlenmeyer several times, the flask put on an asbestos plate and kept very gently boiling for about an hour and a half or two hours, adding hot water from time to time if necessary.

The flask is now cooled and its contents poured out into a liter measuring flask,‡ into which there has been previously taken from a burette 100 Cc. of twentieth normal potassium iodide. The flask is washed several times, the washings added to the measuring flask, and the latter filled up to 1,000 Cc. and set aside over night. 500 Cc. are now filtered off into another liter flask, 50 Cc. of twentieth normal silver nitrate and nitric acid are added to the flask, which is filled up to 1,000 Cc., well shaken, filtered, and

* In the remaining procedure, the simplest way would be to precipitate the berberine with hydrochloric or nitric acid, but in this case a considerable amount of extractive matter contaminates the precipitate, and the estimation would fall out too high, though the error in this respect might be compensated in some extent by the solubility of the hydrochloride or nitrate in water. But the best way is to purify the berberine by converting it into berberine-acetone, regenerate the alkaloid by means of sulphuric acid, and then estimate it volumetrically by standard potassium iodide.

† Gaze, Arch. d. Pharm., 1890, 607.

‡ The berberine hydriodide being extremely bulky, the error arising from the space occupied by the precipitate is reduced to a minimum by using a large flask.

500 Cc. of the filtered liquid titrated back with fortieth normal ammonium sulphocyanate, using ferric alum as indicator. Twice the number of cubic centimeters of the sulphocyanate solution used is equal to the number of cubic centimeters of the potassium iodide solution consumed by the berberine, representing 10 Gm. of the hydrastis root. By multiplying the number of cubic centimeters of twentieth normal potassium iodide consumed by 0.167125, the percentage of anhydrous berberine in the root is obtained, as 1 Cc. of the potassium iodide solution is equal to 0.0167125 of berberine.

In our assay of *Hydrastis canadensis*, three samples of powdered hydrastis were treated in the way described. The berberine was estimated volumetrically, the hydrastine both iodometrically and gravimetrically.

	For Hydrastine. Iodine consumed by 2 Gm. of the root.	Hydrastine. Iodometric.	Hydrastine. Gravimetric.
1	0.0760015	2.29	2.29
2	0.0772012	2.33	2.30
3	0.0777770	2.35	2.28

	For Berberine. Number of Cc. of $\frac{N}{20}$KI consumed by 10 Gm. of the root.	Berberine anhydrous.
1	15.1	2.52
2	15.3	2.55
3	14.8	2.47

RESPECTING THE OPIUM ASSAY.

Last year we reported * a morphiometric assay of opium, the chief features of which were :

1. Extraction of the drug by a special method of percolation to separate the morphine.

2. The volumetric estimation of the extracted morphine by standard iodine. In this method only 1 Gm. of opium is taken.

As a result of our further work we now offer some additions to this process of opium assay, as follows :

1. A more desirable solvent for the extraction of the morphine.

2. An adaptation to the use of standard acid for those who prefer it instead of iodine, in the volumetric determination of the morphine. This, however, makes it advisory that 3 Gm. of opium be taken instead of 1 Gm.

Having additional experience, we present a new statement of the directions for the work, in the accompanying paper entitled "Directions for Certain Alkaloidal Assays."

* Pharm. Arch., 1, p. 121; A. Ph. A. Proc., 1898, p. 340; J. Am. Chem. Soc., 1898, p. 724.

In respect to the deficiencies of ordinary opium assays the following observations may be made:

1. In most of the methods there is no proof that the opium is completely exhausted.

2. It is not proven that the narcotine is fully removed, and the same may be said of most of the other opium alkaloids beside morphine.

3. The heat of evaporation is liable to affect morphine injuriously, easily oxidizable as it is.

4. The crystalline precipitation of morphine is not complete, and it is not known exactly how much of it is left in the mother liquor.

5. Some other matters are carried down with the precipitated morphine and weighed as such.

Three assays of a sample of opium, which by the method of the U.S. P., 1890, was found to contain 14 per cent. of morphine, were carried out by the method described in the accompanying paper. Both the alkalimetric and iodometric methods, agreeing quite well with each other, gave results considerably above those obtained by the U. S. P. method.

Opium taken in grammes.	$\frac{N}{20}$ acid consumed by 2.5 Gm. opium.	Grammes of iodine consumed by half a gramme opium.	Per cent. morphine found.	
			Alkalimetr.	Iodometr.
1.3	31.1	0.116652	17.66	17.50
2.3	31.5	0.116672	17.90	17.50
3.3	31.3	0.116590	17.78	17.49

HOT EXTRACTION INSTEAD OF COLD PERCOLATION IN THE ASSAY OF OPIUM.*

Instead of extracting the morphine from the opium by cold percolation with an alcohol-chloroform mixture as here described, hot extraction with chloroform alone in a suitable extraction apparatus may be used. Though morphine is very slightly soluble in cold chloroform, it dissolves much more easily on the application of heat. This has been shown by Florio,† and verified by us. The most suitable apparatus for this case is undoubtedly that of Dunstan and Short,‡ as it can be used for cold percolation as well as for hot extraction. If this method of extraction be preferred, the opium mixed with the sodium chloride is placed in this apparatus and exhausted by cold percolation with benzol, as described above. A current of dry air is then passed through the tube till the powder becomes dry, which can be seen by the light color that the powder assumes, or by the fact that the tube ceases to feel colder than the surrounding medium, the apparatus then connected with a small round-bottomed flask containing 40 to 50 Cc. of

* See the section on the hot extraction method as an alternative to cold percolation, in the general process for analytical extraction of drugs in "Directions for Certain Alkaloidal Assays."

† Gaz. chim. Ital., 13, 496,

‡ Pharm. Jour. (3), xiii, 664.

chloroform, and the powder extracted on a water-bath till exhaustion is complete. Care should be taken that only a small surface of the bottom of the flask be heated, and that a layer of solvent be constantly on top of the powder. Most of the chloroform can then be distilled off and the balance evaporated from a shallow vessel. The residue in the evaporating dish and that left in the flask are then taken up with acid (standardized if an alkalimetric assay is intended) and the operation finished as above. If only an iodometric assay is desired the acid solution is made up to a given volume, shaken with a small quantity of calcium hydrate, and the filtered half of the solution treated with iodine as above. In this case only 1 Gm. of opium need be used.

COMPARATIVE MERITS OF IODOMETRIC ESTIMATION.

Of the various devices which have been resorted to in the estimation of alkaloids, two general methods are especially worthy of regard because of their directness and simplicity, namely the gravimetric method and the alkalimetric method.

The gravimetric method, undertaking chiefly by solvents to separate the alkaloid and weigh it uncombined, with the advantage of extreme simplicity of principle, has the disadvantage of depending upon solvents for separation from non-alkaloidal matters, a separation lacking in exactness and requiring repetitions which take up much time. The result is apt to be a compromise between the loss of alkaloid left behind in the solutions, and the gain in weight by impurity in the final product.

The alkalimetric method is certainly based upon the best of principles, and so far as it can be readily executed with exactness, it should have the preference. Unfortunately, the combination of alkaloids with acids is not a reaction quickly and sharply defined. The presence of ammonia must be excluded. The end reaction depends so much upon the choice and quality of the indicator, the personal equation of the operator and the light where the observation is made, that results are often in doubt, or ought to be.

The iodometric method, in the instances of alkaloids which form distinct higher periodides insoluble in excess of the reagent, has claims as follows: It is based upon fixed chemical proportions deduced from analyses of the products of the reaction; the end-reaction is very sharp indeed; the actual exactness of the estimation has been verified; and the volumetric reagents required are among those most commonly in use and of earliest introduction into the pharmacopœias. The estimation is done in an acid solution, and ammonia or other alkali does not interfere.

COMPARISON OF IODOMETRIC AND GRAVIMETRIC RESULTS.

NUX VOMICA.

Drug.		Quantity taken for assay. Grammes.	Iodine consumed.	Percentage of alkaloids. Iodometric.	Gravimetric.
Iodometric	1	1	0.0526816	2.52	...
	2	1	0.0526725	2.52	...
Gravimetric	1	1	*	...	2.73
	2	1	*	...	2.73

BELLADONNA ROOT.

Iodometric	1	2.5	0.0459179	0.52	...
	2	2.5	0.0459263	0.52	...
Gravimetric	1	2.5	*	...	0.51
	2	2.5	*	...	0.51

BELLADONNA LEAVES.

Iodometric	1	5	0.0478286	0.27	...
	2	5	0.0475922	0.27	...
Gravimetric	1	5	*	...	0.28
	2	5	*	...	0.28

IPECAC ROOT.

Iodometric	1	2	0.0957764	2.61	...
	2	2	0.0986633	2.69	...
Gravimetric	1	2	*	...	2.63
	2	2	*	...	2.62

Dr. Prescott also read in abstract the second paper, the full text of which is here given:

DIRECTIONS FOR CERTAIN ALKALOIDAL ASSAYS.

BY H. M. GORDIN AND A. B. PRESCOTT.†

A GENERAL METHOD FOR THE EXTRACTION OF ALKALOIDS IN ASSAYS.

I.—AS A METHOD BY PERCOLATION.‡

One to four Gm. of the finely powdered drug is weighed into a low wide-mouthed vessel, with a round bottom, holding eight or ten ounces,

NOTE.—Analytical results in support of these directions are given in an accompanying paper, "Further Work Upon the Estimation of Alkaloids and the Assay of Alkaloidal Drugs," presented in this Association at this date. Also, in the paper entitled "Certain Alkaloidal Periodides. and the Volumetric Estimation of Alkaloids as Higher Periodides," by the same authors, Proc. Am. Phar. Assoc,, 1898. p 340; Pharm. Arch., I. p. 121; J. Am. Chem. Soc., 1898, p. 724. A paper on Hydrastine Hexiodide and Assay of Hydrastis, Am. J. Pharm., 1899, p. 257. Further, see the article "The Periodides of the Alkaloids as Molecular Forms for Estimation," etc., by A. B. Prescott, 1897, Pharm. Review, Vol. 15, and other papers since 1895.

* Alkaloids shaken out and weighed.

† In the Work of Research Committee D., Section 2, Committee on Revision and Publication of the Pharmacopœia of the United States, 1890–1900.

‡ These directions were published, nearly as here given, by the authors, in an article, "Emetine Octoiodide," etc., Pharm. Review, Vol. 17, 1899. This general method is not applicable to Ipecacuanha. See under "Assay of Ipecacuanha," further on.

and having a well-fitted cork, such as a screw-top ointment-jar.* The powder is rubbed up with a small pestle to a fine paste, by adding a little of a solvent mixture, composed of stronger ammonia water and alcohol each five Cc., chloroform ten Cc., and ether twenty Cc.† Then a few more cubic centimeters of this mixture are added, so as to have the drug well covered with the liquid, using in all about five times the amount of the drug taken. The vessel is corked, with the pestle inside, and is set aside for about four or five hours, taking care to agitate by circular movement very frequently during that interval. After that time the cover is removed, and the vessel kept in a current of air, stirring frequently till all odor of ammonia has disappeared. With a good draught and frequent stirring the powder will be almost perfectly dry in about one hour. The vessel is then put into a vacuum desiccator over sulphuric acid for about four or five hours.

An amount of powdered sodium chloride,‡ equal to about five or six times the amount of drug employed, is then carefully mixed in, with use of the pestle, and the whole thrown into a small percolator, one provided with a glasss stop-cock and having a plug of cotton at the bottom. §

The vessel is then cleaned out several times with small quantities of sodium chloride, and the cleanings added to the percolator. The mixture in the percolator is then covered with a little of the cotton which is pressed down with a piece of glass, and a suitable menstruum, usually chloroform, is poured slowly into the percolator till the menstruum reaches the stop-cock. The latter is then closed, the percolator covered and set aside for five or six hours. After that time the stop-cock is opened, and the drug exhausted with the menstruum, percolating until ten drops of the percolate being evaporated on a watch-glass, and the residue taken up with a few drops of acidulated water, the solution shows no turbidity whatever on adding a few drops of the solution of iodine. When finished, the percolate, which is received in a flat evaporating dish, is placed in a good draught at a temperature of about 30° C. When the liquid is reduced to a very small volume, ten Cc. of acidulated water ‖ are added, and then a few cubic centimeters of ether, or petroleum ether, so as to have an ethereal liquid cover the aqueous solution,¶ when the whole is stirred with a

* An ordinary teacup fitted with a specie cork answers well.

† In the case of Hydrastis canadensis the chloroform is replaced by an equal volume of ether.

‡ In the case of Hydrastis the sodium chloride is replaced by barium nitrate.

§ A suitable percolator is easily made out of an ordinary piece of glass tubing fitted with a perforated cork, through which passes a tube having a glass stop-cock.

‖ If an alkalimetric assay is intended, the acidulated water in the operation should be closely standardized and taken in definite quantities.

¶ If the menstruum is all evaporated off it is sometimes difficult to dissolve out the alkaloids with the acidulated water. If chloroform be used, coming below the aqueous layer, it evaporates too slowly.

glass rod until all the ethereal liquid is driven off. The liquid is then filtered, and the evaporating dish and filter washed several times with acidulated water. In this way is obtained a colorless solution of the alkaloid, which can be worked up for any method of estimation.*

II.—AS A HOT EXTRACTION METHOD.

Instead of the cold percolation, as above directed, hot extraction in any suitable apparatus may be used, all other features of the operation being the same. If a Soxhlet tube is used, care should be taken that the syphon works intermittently, as otherwise the extraction is very incomplete; if Dunstan and Short's apparatus† is used, the boiling of the solvent should be so regulated as to have always a layer of about two centimeters of it on the top of the drug. Our experience has taught us that for quantitative work cold extraction by percolation requires less skill and care than hot extraction in a Soxhlet tube, though with careful operation the latter method is preferable.

THE VOLUMETRIC ESTIMATION OF ALKALOIDS BY PRECIPITATION WITH FREE IODINE.‡

Estimation by Formation of a Periodide, so far Applied to Atropine, Morphine, Strychnine, Brucine, Emetine, Hydrastine and Caffeine.

For opium assay see p. 5.

For assay of nux vomica, with separation of strychnine from brucine, see p. 8.

For assay of ipecac, see p. 9.

For estimation of berberine in assay of hydrastine, see p. 9.

For estimation of caffeine, the alkaloidal solution must be invariably acidulated (Gomberg, 1896). For assay of kola, see Knox and Prescott, 1896–7, Proc. Am. Phar. Assoc., *44*, p. 128, and *45*, p. 131; J. Am. Chem. Soc., *19*, p. 63; *20*, p. 34.

The Reagents and Utensils Required in the Volumetric Work.

(1) A standardized solution of iodine dissolved in water with potassium iodide to be of about decinormal strength (12.653 Gm. of free iodine in 1000 Cc.). The solution may be made as the volumetric test solution of iodine of the U. S. P., and used with the exact decinormal factor of iodine if preferred.

* The method of extraction described above presents particular advantage in those cases where several alkaloids soluble in different menstrua are present in the drug, as by using these menstrua successively, a separation of the alkaloids can be easily effected. This principle we have applied to the assay of opium, and to that of Hydrastis canadensis.

† Pharm. Jour. (3), xiii, 664.

‡ These directions were given in substance in an article entitled "Emetine Octoiodide and the Estimation of Alkaloids Generally," by the authors of this paper, in J. Am. Chem. Soc., *21*, p. 234, March, 1899; Pharm. Review, vol. 17, 1899.

(2) A solution of sodium thiosulphate, of about decinormal strength, standardized to known ratio with the iodine solution. The Volumetric Test Solution of Thiosulphate of the U. S. P. may be used.

(3) The Starch Test Solution of the Pharmacopœia.

(4) The burettes and centesimal measuring vessels for any volumetric work in analysis.

THE VOLUMETRIC OPERATION.

The final alkaloidal solution obtained by whatever mode of extraction,* but always representing a definite quantity of the drug to be assayed, is poured slowly and with constant stirring into a flask holding 100 Cc., in which has been previously drawn twenty or thirty Cc. of the standardized solution of iodine, and one or two Cc. of dilute hydrochloric acid † (U. S. P.). The flask is then filled up to 100 Cc., stoppered, and well shaken till the periodide has separated out. The supernatant liquid is to be perfectly transparent, but of a red iodine color. Fifty Cc. are then filtered off, and in this portion the excess of iodine determined by means of standard sodium thiosulphate. The amount of iodine consumed, multiplied by the proper factor, gives the amount of alkaloid present in the quantity of drug taken.‡

In case more than one alkaloid be present in the drug, a *mean iodometric* factor can be drawn, as shown for strychnine and brucine in the list of factors. In alkalimetric estimations a mean factor is often used in assay for total alkaloids, and the same is equally justifiable in iodometric work, when the data are known.

Should there be no precipitate with iodine, but only a slight turbidity, then the drug is extremely poor, and for the assay a much larger quantity than has been used should be taken. On the other hand, should the supernatant liquid, after adding the alkaloidal solution to the solution of iodine and separating the periodide by shaking, have very little color, or be almost colorless, then it is certain that the drug is very rich, and either a smaller quantity of the drug, or a larger quantity of the iodine solution must be employed in the assay.

Generally, if the drug contains as much as three per cent. of alkaloid, 1 Gm. should be taken for the assay; if it contains less than the above

* Directions for extraction are given further on. Other procedure for extraction is given in Lyons' Handbook of Assaying, 1899, Detroit, Nelson, Baker & Co., page 26 to 30.

† It is always to be remembered, that this estimation by formation of *higher* periodides, requires the alkaloid to be added slowly *to* the iodine, with excess of the latter. Except in the case of morphine an excess of acid is not hurtful, and even promotes the separation of the periodide. Hydrochloric is to be preferred to sulphuric acid.

‡ For example: If operating upon two Gm. of powdered ipecac root, the iodine consumed be 0.957764, then the *percentage* of emetine in the drug equals $0.957764 \times 0.55 \times 100/2 = 2.63$.

amount, but not less than two-tenths of one per cent. of alkaloid, then a quantity between one and five Gm. should be taken.

The Iodine Factors.

The precipitate formed.	Quantity of alkaloid to 1 of iodine consumed.	Quantity of alkaloid to 1 Cc. of tenth-normal solution of iodine.*
Atropine, $C_{17}H_{23}NO_3.HI.I_8$	0.285	0 00361
Morphine, $C_{17}H_{19}NO_3.HI.I_3$	0.749	0.00948
Strychnine, $C_{21}H_{22}N_2O_2.HI\ I_6$	0.439	0.00556
Brucine, $C_{23}H_{26}N_2O_4\ HI.I_6$	0.518	0.00655
Mean of strychnine and brucine,	0.478	0.00605
Emetine,† $C_{28}H_{40}N_{20}O_5.HI.I_7$	0.55	0.006
Hydrastine, $C_{21}H_{21}NO_6.HI.I_5$	0.604	0.00764
Caffeine, $C_8H_{10}N_4O_2.HI.I_4$	0.383	0.00485

THE ASSAY OF OPIUM.

The Extraction of the Morphine and its Volumetric Estimation Either by Standardized Solution of Acid, or by Standardized Solution of Iodine.‡

For the use of *hot extraction instead of cold percolation* in treatment of the opium in this process, see the accompanying article, "Further Work Upon the Estimation of Alkaloids," in which also are included a few results in comparison with the U. S. P. method, and a brief discussion of the subject.

The Materials and Utensils for the Assay.

Opium in very fine powder. Powdered sodium chloride, such as is used for the table. An ethereo-ammoniacal mixture composed of stronger ammonia water (U. S. P.) and alcohol, of each 5 Cc.; chloroform, (U. S. P.) 10 Cc., and ether 20 Cc. Benzol boiling at about 80° C. A mixture of one volume of absolute alcohol and five volumes of chloroform.

* If the analyst prefers to standardize his volumetric solution of iodine to exact decinormal strength, or to adjust the consumption of iodine to this strength by use of a correcting factor, then he will multiply the Cc. of iodine solution consumed by the proper factor in this column. (1 Cc. decinormal solution contains 0.012653 Gm. of iodine.) The more simple way, however, is to register the actual quantity of iodine in 1 Cc. of the solution, be the same above or below the 0.012653 Gm., and multiply this actual quantity by the number of Cc. used up, so as to get the *weight* of iodine consumed. This, multiplied by a factor of the first column above, gives the quantity of alkaloid estimated, in grammes.

† That is, a provisional representative of the total alkaloids of ipecacuanha.

‡ This method of assay with the iodometric estimation appeared in its primary form, with the analysis of morphine tetraiodide, etc., in an article by the present authors, in June, 1898, (Pharm. Archives, I., p. 121), and with some additions in Proc. Am. Phar. Assoc., 1898, p. 340, (also in J. Am. Chem. Soc., 1898, p. 724). The directions with adaptation to the alkalimetric way of estimation, as here given, formed a part of "The Assay of Opium: A Supplementary Note" in the Pharmaceutical Review, *17*, 1899, and to appear in the *Archiv der Pharmacie.*

Twentieth normal sulphuric acid and twentieth normal potassium hydrate solution. Neutral methyl orange paper. Standard solution of iodine, of any known strength in the neighborhood of one per cent., and standard solution of sodium thiosulphate of about twentieth normal strength.

A four or six ounce screw-top ointment jar, having a bottom concave within. A small pestle, just long enough to rest half upright within the jar when it is closed. A small glass percolator provided with a stop-cock, and of the length of about 22 centimeters and inner diameter of about 1.3 centimeters.*

Directions for the Assay.

Weigh out three Gm. of the opium into the ointment jar, rub it up by means of the pestle with a few Cc. of the ethereo-ammoniacal mixture to make a fine paste, taking care not to smear the sides of the jar unnecessarily, then add about 2 Cc. more of the same mixture, so as to have the opium well covered with liquid, screw down the top, leaving the pestle inside, and set the jar aside for five or six hours. After that time the jar is opened, about ten Gm. of the sodium chloride thoroughly mixed in with the opium, and the open jar placed in a good current of air, stirring frequently with the pestle in order to prevent formation of lumps. In about an hour the powder will be nearly dry. The jar is then placed in a vacuum desiccator containing, besides sulphuric acid, a vessel of paraffin, and left there over night. The jar is then taken out, any lumps in the powder carefully crushed with the pestle, and the mixture transferred first to the glazed paper, and then to the percolator, in the bottom of which a plug of cotton has been placed. The jar is rubbed out several times with small quantities of the sodium chloride, the rinsings added to the percolator, and, having placed a plug of cotton and a piece of glass on the top of the powder, the opium is extracted with benzol by percolating very slowly, until, upon evaporating ten drops of the percolate on a watch-glass, and taking up the residue with ten or twelve drops of very slightly acidulated water, no turbidity appears by the addition of two drops of the iodine test solution. After the narcotine, thebaine, codeine and most other alkaloids have in this way been completely removed by the benzol, the receiver is taken away† and a shallow evaporating dish placed under the percolator.

The percolation is now continued slowly with the mixture of alcohol and chloroform,‡ until ten drops of the percolate tested as above give no reaction for alkaloids. The evaporating dish is now put into a good current of air, and left over night,§ or until the solvent has disappeared. The

* The lower part of a burette cut in two answers very well.

† The benzol, of course, can be recovered by distillation, and used over and over again.

‡ See Burg., Ztschr. anal. Chem. 19, p. 222.

§ This makes the whole assay occupy about two days and two hours, if it be started in the morning.

bottom of the dish will then be found to be covered with a good crop of crystals intermixed with a little resinous matter.

Estimating in the Alkalimetric Way.

Fifty Cc. of the twentieth normal sulphuric acid are now carefully run out from a burette into the evaporating dish, the contents rubbed well with a pestle till everything is detached from the bottom and sides of the dish, and then, without filtering, poured into a tall narrow measuring cylinder. The dish is then carefully washed several times with small quantities of water, the washings added to the cylinder, and the latter filled up to make 90 Cc. After shaking well a few minutes, and setting aside till solid particles have settled down,* 75 Cc. representing two and a half Gm. of the opium, are filtered off into a beaker holding some 250 or 300 Cc., about 50 Cc. of water added, and then 35 or 40 Cc. of the twentieth normal potassium hydrate run out from a burette into the beaker. Twentieth normal sulphuric acid is now carefully added, one Cc. at a time, stirring with a glass rod and testing the liquid after each addition by immersing for about fifteen seconds small strips of neutral methyl orange paper. As soon as the paper becomes reddish, one Cc. of the potassium hydrate solution is added, and then again of the sulphuric acid, adding now one-tenth of a Cc. of the latter at a time, till the paper becomes reddish. In order to get exact results, the acid and alkali solutions should be standardized in nearly the same conditions under which the titration of morphine takes place, that is, using about 175 Cc. of liquid, and noting the appearance of the reddish tint upon the test paper at the point of neutrality. The strips of reagent paper should, of course, be wet with the wash bottle before immersion in the beaker. Though the solution of morphine has a yellow color from some extractive matter, so that the end reaction cannot be found by adding a liquid indicator to the solution, there is not the slightest difficulty in noting the appearance of the reddish tint upon the cream-colored methyl-orange paper. Of course, other indicators, like iodo-eosin in ethereal solution, etc., might be found to give equally good results, but having found the dip test with methyl-orange paper to give sharp and definite results with this alkaloid, we have not experimented upon other indicators.

1 Cc. of twentieth normal acid being equivalent to 0.0142 Gm. anhydrous morphine, the number of Cc. of the acid consumed by the alkaloid from two and a half grammes opium, multiplied by 0.568 ($=0.0142.\frac{100}{2.5}$), gives the percentage of morphine in the opium.

Estimating in the Iodometric Way.

When it is desirable *to control* the alkalimetric assay with an iodometric one, the contents of the beaker are emptied in a 250 Cc. measuring flask,

* The filtration is much accelerated if the waxy particles are prevented from entering the filter.

washing the beaker two or three times with small quantities of water, the flask filled up to 250 Cc., about 3 or 4 Gm. calcium hydrate added, and the mixture shaken for about an hour. This treatment removes a good deal of the coloring matter, but keeps the morphine in solution. 50 Cc., which represent half a gramme of opium, are now filtered off into a 100 Cc. flask, and the liquid slightly acidified with hydrochloric acid. The liquid will now be only slightly colored. 20 Cc. of the standard iodine are now run out from a burette into the flask, the latter filled up to 100 Cc., and the flask well shaken till the supernatant liquid becomes perfectly transparent, but has a dark-red iodine color.* 50 Cc. are now filtered off and the excess of iodine determined by the standard sodium thiosulphate, using starch as indicator. The amount of iodine consumed by the half gramme of opium, multiplied by 149.8 $= 0.749 \times 100 \times 2$),† gives the percentage of morphine in the opium.

If only an iodometric assay be desired but 1 Gm. opium need be taken for the assay, and the latter conducted exactly as described above up to the point where the chloroform-alcohol has been removed by evaporation. At this point the residue is taken up with good lime water by rubbing the evaporating dish thoroughly with it, pouring the mixture in a 100 Cc. flask, filling the latter up with lime water to make 100 Cc., shaking the flask about an hour, filtering off 50 Cc. into another 100 Cc. flask, acidulating and then finishing up as above.

THE ASSAY OF NUX VOMICA.‡

The acidulated water solution of the total alkaloids of the drug, as obtained by the directions on page given above, or other method of extraction, is made up to a definite volume, say 100 Cc. If 4 Gm. of the drug have been taken, then 25 Cc. will represent 1 Gm. of the drug, and will be sufficient for one estimation. This volume, then, is run from a burette into a 100 Cc. flask in which has been placed 20 Cc. of the decinormal iodine solution and 2 Cc. dilute hydrochloric acid, when the amount of iodine consumed by the total alkaloids in that 1 Gm. of nux vomica is reached in the way described above. Let that amount be *a*. If only the amount of total alkaloids in the nux vomica is desired, it is sufficient to multiply *a* by 47.8, which is equal to 100 times the mean factor of strychnine and brucine, and the *percentage* of total alkaloids is at once obtained.

For the Separate Estimation of Strychnine and Brucine a modification of Dunstan and Short's § method of separation by ferrocyanide, we have

* See our article in J. Am. Chem. Soc., 1898, p. 722; Proc. Am. Phar. Assoc., 1898, p. 368.

† 0.75 is here taken instead of 0.74914, which is the factor for morphine (*Loc. cit.*, p. 724.

‡ From an article by the authors in Pharm. Review, vol. 17, 1899.

§ Pharm. J. Trans., (3), 14, 290; Am. J. Pharm., 1883, 579. Any other method of separation of strychnine and brucine may be used with the iodometric estimations.

found to work fairly well as follows: Another portion of the alkaloidal solution, representing 2 Gm. of the nux vomica, that is 50 Cc., is run out from the burette into an Erlenmeyer flask of the capacity of about 300 Cc., and to the contents of the flask 10 Cc. of a two per cent. solution of sulphuric acid is added, and then water enough to make in all about 200 Cc. Then pour in 25 Cc. of a five per cent. solution of potassium ferrocyanide, stopper the flask, and shake continuously for about half an hour. Now filter, wash the precipitate on the filter repeatedly with water containing one per cent. of sulphuric acid till a few drops of the filtrate diluted with a little water have no bitter taste. The filter is then pierced, and the precipitate rinsed with use of the wash-bottle into a 100 Cc. flask. To the contents of the flask are then added 20 Cc. of a five per cent. solution of zinc sulphate, and the flask kept on a boiling water-bath for about fifteen minutes. The zinc sulphate decomposes the strychnine ferrocyanide, zinc ferrocyanide is precipitated, and strychnine sulphate remains in solution. The flask is then completely cooled, and water enough added to make 100 Cc. Of this, 50 Cc. representing again 1 Gm. of the nux vomica, but deprived of the brucine, are then filtered off and run out from the burette into a 100 Cc. flask containing 20 Cc. decinormal iodine solution and about 2 Cc. of dilute hydrochloric acid. The amount of iodine consumed by the strychnine alone is then determined as above. Let it be b. Then $b \times 43.9$ (100 times the strychnine factor) gives the percentage of strychnine, and $(a—b) \times 51.8$ is the percentage of brucine in the nux vomica.*

ASSAY OF IPECACUANHA.

For extraction of the drug, use one of the methods given in Lyons' Assaying.† The cold percolation process of extraction previously directed as already remarked, does not work well with this drug. ‡

* To test the exactness of this method, we prepared a solution containing known quantities of each of these alkaloids, and determined the same by the described method. The results, as can be seen from the following statement, are fairly satisfactory, if we consider the well-known difficulties of this separation. The solution contained 0.16 per cent. strychnine and 0.22 per cent. brucine (anhydrous).

Iodine consumed by 10 Cc. before the removal of brucine.	Iodine consumed by 10 Cc. after the removal of brucine.	Found. Strychnine.	Found. Brucine.	Contained Strychnine.	Contained Brucine.
1 ..... 0.0843132	0.032397	0.14	0.24	0.16	0.22
2 ..... 0.0843130	0.032397	0.14	0.24	0.16	0.22

† Detroit, 1899.

‡ Ether, chloroform, and acetone were tried as menstrua in the cold percolation, but the results were too low. The ammoniated mixture fails to yield all the alkaloid. This possibly explains why Flückiger,§ extracting by ammoniated chloroform, obtained exceptionally low results. See also Guareschi, Alkaloide, 1896, p. 527.

§ Pharm. Zeitung, 1886, p. 30.

In iodometric estimation the total acidulated alkaloid solution is made up to a definite volume, an aliquot portion taken, and added to a measured excess of the iodine solution, as directed heretofore. The iodine factor of emetine is taken as fairly near the mean factor of the total alkaloids.

ASSAY OF HYDRASTIS.

In the assay of *Hydrastis canadensis*, for berberine and for hydrastine, the directions for the assays are given in the accompanying article entitled "Further Work Upon the Estimation of Alkaloids," etc. In the plan of the assay the hydrastine is dissolved with absolute ether, and estimated iodometrically, as a hexiodide. The berberine, undissolved by the absolute ether, is estimated volumetrically by precipitation as berberine hydriodide, the excess of the precipitant, potassium iodide, being determined by silver nitrate with sulphocyanate. But before the berberine is precipitated as hydriodide, it is separated in its acetone compound. And before the alkaloids are acted upon by the reagents, they are liberated from the powdered drug by maceration with an ethereo-ammoniacal mixture.

Some discussion in connection with the two papers just read was entered into by Messrs. Prescott, Hallberg, Hurty, Gordin, Caspari, Stevens and others, in the course of which Dr. Gordin explained more fully his methods of procedure in regard to process of extraction, preparation of standard solutions, etc.

THE CHAIR: I think a vote of thanks should be extended the Committee of Research for so ably carrying out the work of the year, and I will entertain a motion to that effect.

Such vote of thanks was moved by Mr. Good, and seconded by Mr. Caspari, and unanimously carried.

THE CHAIR: I find we have another paper from this same committee from Dr. Dohme and Dr. Englehardt, and as neither of these gentlemen is present I will ask Mr. Caspari to read it.

Mr. Caspari read the paper, which was as follows:

SOME ASSAYS AND FACTS CONCERNING GOLDEN SEAL ROOT.

BY ALFRED R. L. DOHME AND HERMANN ENGELHARDT.*

This work was undertaken as part of the work of the Research Committee, and without being part of any consecutive or collaborative work of that Committee, is offered as this year's contribution to the same. Golden Seal is being used very largely now, and for more diseases than formerly, so that its assay may be considered to be of importance, and should be accurate. Several methods of assay for the drug have been suggested and

* Presented by the Special Committee of Research.

by many adopted: among them being Keller's, Linde's and Prescott's. We have compared these three methods on several kinds and specimens of root. It has, furthermore, been a mooted question if so-called fall dug Golden Seal root is better or not better than so-called spring-dug root. Most pharmacists and dealers in drugs have always considered the fall-dug root to be more valuable than the spring-dug root, primarily and probably solely because it is the bolder and heavier root of the two. It has further been a question whether or not the rootlets of golden seal root have any medicinal value, or whether, perhaps, the rhizome alone, when free of rootlets, would not be more valuable medicinally, and hence preferable to the rhizomes with rootlets as usually offered for sale.

We believe we have answered all the queries in this paper, at least we can say that for the samples in hand, each assayed by the three methods given, we have arrived at conclusions which, to become general, should probably be tested on more samples. Our previous work * upon this drug has been to show that both when fresh and when dry, a certain amount of hydrastine is contained in it in the free state, and a certain amount in the combined state, combined with some acid. This result has since been confirmed by Linde, in Germany.

Relative to the methods of assay employed, we must again call attention to the modification desirable in both Linde's and Keller's as to the amount of ethereal or alcoholic solution to be poured off and weighed for the assay. In some of the samples tested we could pour 100 Gm. by Keller and measure 61 Cc. by Linde, but in some of them we could not, viz.: Sample I., 86 Gm. by Keller, and 51 Cc. by Linde; Samples II. and III., 100 Gm. and 61 Cc., as required by the methods; and Sample IV., only 98 Gm. by Keller, and 55 Cc. by Linde. It would seem desirable to either increase the amount of solvent originally added, or reduce the amount of the same to be ultimately weighed or pipetted off. Prescott's method gave us lower results than the others in all cases but one, but before we give any definite opinion upon its merits relative to the methods of Keller and Linde, we desire to work a little longer with it, and become better acquainted with its details. Being of recent origin, we have not had frequent occasion to use it, as all of our previous golden seal assays have been made by Keller's and Linde's methods, especially the former. In reference to Prescott's method, we desire to remark that we have found it quite painstaking and labor-absorbing, for it usually required ten to twelve extractions in the Soxhlet apparatus with ether before the runnings failed to give a reaction with Mayer's reagent. Linde has recently † critically examined Keller's and other methods of alkaloidal assay, and complains of several short-comings, notably the preferable ac-

* Proceedings American Pharmaceutical Association, 42, page 190.

† Archiv für Pharmacie, 399.

curacy of pipetting off to weighing extracting media in assays. We cannot agree with Mr. Linde, as we have in our eight years' experience found that weighing is fully as accurate, although not as convenient as measuring liquid extracting media. It is, of course, easy to criticise, and no method is probably flawless; but as a general alkaloidal assay method, we have found Keller's in many years' practice to be the most satisfactory yet devised. Our results follow:

SAMPLE I. Golden Seal root—fairly bold, *with rootlets*, well dried and dug in the spring of 1899 in West Virginia.

Hydrastine, in pure white crystals	by	Keller's	method	....	3.27	per	cent.		
"	"	"	"	"	"	Linde's	"	....	2.70	"	"
"	"	"	"	"	"	Prescott's	"	....	2.32	"	"
"	volumetrically			"	"		"	....	3.20	"	"

SAMPLE II. Golden Seal Root—quite bold, *free from rootlets*, well dried, and dug in fall of 1898 in Ohio; the rootlets were carefully removed and assayed separately as Sample IV.

Hydrastine, in pure white crystals,	by	Keller's	method	....	3.25	per	cent.		
"	"	"	"	"	"	Linde's	"	....	3.30	"	"
"	"	"	"	"	"	Prescott's	"	....	2.70	"	"
"	volumetrically			"	"		"	....	2.90	"	"

SAMPLE III. Golden Seal Root—fairly bold, *with rootlets*, well dried and dug in the fall of 1898 in West Virginia.

Hydrastine, in pure white crystals,	by	Keller's	method	....	1,76	per	cent.		
"	"	"	"	"	"	Linde's	"	....	1.95	"	"
"	"	"	"	"	"	Prescott's	"	....	1.49	"	"

SAMPLE IV. Golden Seal Rootlets—removed carefully from Sample II.

Hydrastine, in pure white crystals,	by	Keller's	method	....	2.49	per	cent.		
"	"	"	"	"	"	Linde's	"	....	2.50	"	"
"	"	"	"	"	"	Prescott's	"	....	2.25	"	"

In all these assays the hydrastine was accompanied by a yellow, resinous substance which we believe is canadine, an alkaloid observed by Schmidt. We did not examine it, but removed it from the hydrastine to get the latter pure and white.

The above results seem to indicate, *first*, that Keller's and Linde's methods are of about equal value and reliability in assay of golden seal, and both appear to give higher results than Prescott's gravimetric process (before we can give positive evidence on the latter point and on his volumetric method of assay, we desire further trials by his process of assay); *second*, that spring-dug root is certainly not less rich in hydrastine than that dug in the fall, and apparently richer; *third*, that the rhizomes contain more hydrastine than the rootlets, but that the rootlets still contain quite a good deal of the white alkaloids and are by no means to be rejected. Recent work on golden seal on the large scale in an estab-

lishment in the manufacture of hydrastine seems also to indicate that spring-dug golden seal root is fully equal to the fall-dug in content of the white alkaloid. These figures effectually dispose of the old view that golden seal contains only about one and at most two per cent. of hydrastine. Two or three per cent. would be nearer the truth.

Baltimore, Sept. 2, 1899.

The Chair announced that, without objection, the paper would take the usual course, and it was so ordered.

The Chair stated that discussion was now in order upon two papers read just before adjournment of the morning session, viz.: that of Mr. Kraemer on the Valuation of Drugs, and that of Dr. Houghton on Physiological Action as a Department of Pharmaceutical Research.

Dr. Lyons: The papers before us are in striking contrast. They treat upon kindred topics, but approach them from different standpoints. There are two methods of getting at the value of a drug. By chemical methods you may judge accurately of its value, and then there is a rough-and-ready method by which you may approximate its value. In one case you have the scientific result, and in the other the practical result, which may not be of equal value, but still of great value; and for the practical pharmacist it is something in reach.

We owe a great deal to what the Research Committee has done. We have never had until now a practical process that could be carried out by the ordinary pharmacist, and scarcely a process that would be attempted by the chemist, for the assay of opium—the volumetric assay of opium. We have had imperfect methods, and now they are demonstrated to be even more imperfect than we thought. Where we supposed we could obtain 14 per cent. of morphine, we are now shown that 17 per cent. can be obtained. We are now shown how we can go to work with ordinary skill, and almost no apparatus, and determine the morphine value of a sample of opium.

Mr. Hurty: I want to refer to Dr. Houghton's paper. That certainly is an important subject, and he treated it in a masterful way. If there is no such thing as the physiological action of drugs, then, of course, there is no need of Pharmacy. I cannot add anything to his discussion of the subject, but I would call to mind that Pharmacy is a hand-maid to Medicine, and it would be just as appropriate for the pharmacist to go into physiology as into chemistry and botany. Dr. Rusby represents us in our connection with botany, and Dr. Prescott with chemistry, and the importance of the physiological action of drugs cannot be over-stated. I am certain it would be a very important branch for us to consider when Pharmacy is ready to take another step higher. This points another lead that we may follow very satisfactorily.

Mr. Prescott: I wish to express my own very high estimation of work in pharmacology as a branch of the work of the pharmacist, whether in the practice of pharmacy or in pharmaceutical education. I think it is one of the favorable signs of the times that the physiological action of medicines—pharmacology, as we call it—is being made more plain, more easily understood, and that there is much progress in that direction. I think it is one of our most important duties to cultivate a study of pharmacology.

Dr. Whelpley: Mr. Kraemer's paper on the valuation of drugs reminds me of the class of people who are anxious to be in the drug business, but also very anxious to discourage anything in the way of pharmaceutical education, and who not infrequently

bring to bear the argument that the drug business of to-day is a hand-me-out business; that the roots, herbs, barks and other crude drugs of former times are no longer found in the business, and it is no longer necessary for the druggist to become acquainted with them in the old way, because they only handle powdered drugs or the active principles of drugs. It would be a striking revelation to that class of people to show them the results of the efforts—being largely developed through the American Pharmaceutical Association—to readily recognize the identity and quality of powdered drugs, as shown by chemical and microscopic means, and by their physical properties—their odor, taste and color. I think this is one of the arguments that those connected with pharmaceutical education should not overlook, and we should impress upon the pharmacists at large the fact that the changes in the drug business are always made by the educator—the investigator; that they go hand in hand; and that the changes incident to manufacture, to commerce, do not go ahead of the chemist, the botanist, the pharmacognosist—or of the pharmacist, or, if you please, of the druggist of to-day.

Dr. Lowe: I am glad attention is being called at the present time to the physiological action of drugs, because it is an important step in the right direction. Many of the older pharmacists here know considerable about the action of drugs by handling them empirically—by their long experience; but why should not the younger men of the profession—the younger generation—learn these things at once, from the results of the labor of those working in the higher interests of pharmacy? A knowledge of the physiological action of drugs would be of great assistance to him in more ways than one—for instance, he might be enabled thereby to put on the market a line of preparations that would bring him reputation as well as profit.

Mr. Hallberg: I notice the speakers here use the various terms rather loosely; but if we do not have some limitation on them, how are we going to get a clear idea of what is meant when we use them? I am not sure that we are all clear when we speak of the physiological effect of drugs. Do we mean the normal action upon the normal human body? When we speak of the therapeutic action of drugs we refer to the effect of drugs on a human body in disease. I don't know whether this is the general view, but that is the way the standard authors use it. It seems to me we must differentiate considerably when we discuss this question. Would the pharmacist desire to be informed as to the effect of these drugs upon the normal human body, or when the body is diseased, or both? There is a great deal of difference. I hope there is no person present here who will not agree to the proposition that the effect of a drug on the body in a normal condition is different from that in disease—not, of course, speaking of what we call mechanical remedies, such as cathartics or purgatives.

The Chair: The committee was very careful, for this very reason, to speak of the physiological action of these drugs, because the term pharmacology might have been misleading.

Mr. Remington at this point reported for the committee the following resolution of sympathy for Prof. H. Vin Arny. Dr. Lowe seconded the resolution, and it was carried unanimously.

The Scientific Section of the American Pharmaceutical Association, in session at Put-in-Bay, Ohio, September 6, 1899, having heard with great regret of the illness of its efficient secretary, Prof. Harry Vin Arny, desires to extend to him their hearty sympathy. The Section unanimously deplores the loss of his services, and expresses the hope that Prof. Arny may be permitted to resume his duties, and that good health and prosperity may be abundantly restored to him.

THE CHAIR: We will now have a group of three papers on the solanaceous drugs, the first being on Scopola as a Practical Equivalent of Belladonna, by Mr. S. W. Williams; the second on the Introduction of Scopola to the United States Pharmacopœia, by myself, and the third on the Assay of Hyoscyamus, by Mr. W. A. Puckner.

Mr. Williams read his paper as follows:

SCOPOLA AS A PRACTICAL EQUIVALENT OF BELLADONNA.

BY S. W. WILLIAMS.

[An answer to Query 5, "Is it proper to make belladonna preparations from Scopola in the face of the present U. S. P. definition? Should the U. S. P. change its definition so as to sanction the use of this rhizome as an alternative?"].

Having fairly entered upon an era of standardization, the actual value of a drug, from a chemical and physiological standpoint, may be expected to receive even more consideration than is accorded to name, form or source. In fact, to argue the present official requirements for belladonna, and these only, as against standardization based upon active principle, would be to make botanical and physical characteristics of greater importance than uniformity in strength and therapeutic power.

That we have, in the rhizome of Scopola Carniolica, a practical equivalent of the root of Atropa Belladonna, chemically, pharmaceutically and physiologically considered, was fairly demonstrated ten years ago by disinterested investigators of admittedly high standing. Extensive work on Scopola was conducted by the Research Laboratory of the Pharmaceutical Society of Great Britain, the results of which were published in the Pharmaceutical Journal and Transactions, December 14, 1889. To briefly summarize these, Prof. W. R. Dunstan and A. E. Chaston found the alkaloid to be hyoscyamine, with too small a proportion of hyoscine (scopolamine)* to admit of estimation in the quantity of drug examined. A further resemblance to belladonna was found in the presence of cholesterin and a fluorescent principle.

F. Ransom, F. C. S., found scopola specially adapted for standardized preparations.† Dr. Lauder Brunton and Sir Dyce Duckworth, M. D., found‡ by careful clinical tests with standardized preparations of the two drugs, that scopola was fully equal if not actually superior to belladonna, when employed in cases where the use of the latter drug was indicated. E. M. Holmes, F. L. S., established§ the botanical position of scopola as a link between the genera hyoscyamus and atropa. Prof. Thomas Greenish

* Prof. Schmidt found this secondary alkaloid to be scopolamine, which he has proven to be identical with hyoscine. Archiv. der Pharmacie, 1892; Chemist and Druggist, May 28, 1892, p. 771.

† Ph. Jour. & Trans. 1889, p. 461.

‡ Ph. Journ. & Trans. 1889, p. 461 and 466–8.

§ Ph. Journ. & Trans. 1889, p. 470.

found* "a close alliance in anatomical structure between the rhizome of Scopola Carniolica and the root of Atropa Belladonna." Nearly a decade has elapsed and, so far as the writer knows, these reports have stood unquestioned.

Regarding the identity of the alkaloid of belladonna, experiments† were made in the Chemische Fabrik auf Aktien (formerly the Schering Laboratories) "the results of which led to the announcement that neither belladonna root nor hyoscyamus seeds contain *atropine* ready-formed, but instead of this only *hyoscyamine*, the latter being converted wholly or in part into atropine during the process of extraction. At the instance of this establishment, Prof. Will has reviewed the whole subject, and finds the statement to be correct in every particular."

Probably there are no standard works more generally recognized, by pharmacists and physicians as authorities in matters pertaining to drugs than the dispensatories. The United States Dispensatory says (p. 259): "The action of belladonna upon the system is that of atropine," and (p. 242) "The local and general effects of atropine on the system are precisely those of belladonna." By atropine is of course meant belladonna alkaloid. U. S. P. atropine contains some hyoscyamine.

The National Dispensatory (p. 329) states that the alkaloids of scopola are the same as those of belladonna.

The American Dispensatory (1898, p. 340), in speaking of scopola carniolica says that "it has been shown to contain the principal constituents of belladonna, namely: atropine, hyoscyamine, hyoscine (scopolamine)."

Another standard work, to which pharmacists may conveniently refer, is Maisch's Organic Materia Medica. Speaking of belladonna, this authority (pp. 77–78) says: "Young roots contain only hyoscyamine; older roots (8 to 10 years) also atropine. * * Allied drug—The rhizome of scopola carniolica, * * contains the same alkaloids." In commenting on belladonna leaves the same authority says (p. 233) that hyoscyamine is sometimes the predominating alkaloid.

The application of the axiom "two things which equal the same thing are equal to each other" completes the argument for the practical equivalence of the two drugs.

Those who attach great importance to botanical relationship should consider how close, in their therapeutic action, are belladonna and hyoscyamus, the extremes, between which we find scopola. Dr. Wood, in his Treatise on Therapeutics (1894, p. 254) says: "Hyoscyamus may be used to fulfill any of the indications for which belladonna is employed." Dr. Hare, in his "Practical Therapeutics" (1898, p. 224) says, "Hyoscyamus is

* Ph. Journ. & Trans. 1889, p. 472.

† Proceedings A. Ph. A. 1889, p. 441.

used in every condition indicating the employment of belladonna." Dr. Butler, in his Text Book of Materia Medica and Pharmacology (1896, p. 453), says: "Hyoscyamus may be used for the same purposes as belladonna." Dr. Ringer, in his Hand book of Therapeutics, (1897, p. 546) says: "Hyoscyamine, as has been said, is isomeric with atropine; the two are very similar, if not identical in their mode of action." Dr. Coblentz, in his "Newer Remedies" (1899, p. 73), says "hyoscyamin is an alkaloid which occurs with hyoscin and atropin in the seeds and leaves of hyoscyamus niger, also found in the root of atropa belladonna, scopola atropoides* and Japonica. * * The action of hyoscyamin is like that of atropin." Close as belladonna and hyoscyamus are shown to be from a therapeutic standpoint, belladonna and scopola stand in closer relationship, so close as to touch and merge when viewed from a practical standpoint.

The alkaloid scopolamine (hyoscine) constitutes, according to the Merck Laboratories, about one-tenth of the total alkaloid of scopola. Prof. Schmidt found scopolamine in small quantity in belladonna root.† The U. S. Dispensatory (p. 258) says scopolamine is found in small quantity in belladonna root. The American Dispensatory (1898, p. 335) says: "Hyoscine ($C_{17}H_{21}NO_4$), discovered by Ladenburg in hyoscyamus niger, occurs in belladonna root in small amounts (Schuette, 1892)." Dr. Bartholow, in his Materia Medica and Therapeutics (p. 540) says: "In general, hyoscine can be used in the same cases as atropine, but, as it posssesses more decided anti-spasmodic effect, it may prove more valuable;" and again (p. 536), "The testimony of opthalmologists, who have published their observations on scopolamine, is strongly in favor of this remedy in most of the conditions for which atropine is now employed.

In 1890, the writer presented to this Association figures showing in detail the weekly records of six months' working of scopola. The average yield of extract with 80 per cent. alcohol was 25⅓ per cent.; the average percentage of alkaloid in extract 2.35 per cent., and the average strength of 33,150 pounds of the rhoizome 0.59 per cent. alkaloid. These results represent twenty-seven operations. The lowest yield of extract was 22 per cent., assaying 2.5 per cent. alkaloid; the highest yield was 28 per cent. extract, assaying 2.11 per cent. alkaloid. These extremes of variation show a remarkable uniformity in the strength of the drug itself. As compared with work on the root of atropa belladonna, the percentage of alkaloid is somewhat higher, being in about the proportion of 0.58 for

* Scopolia atropoides is given by Dr. Holmes (Ph, Journ. & Trans. 1889, p. 469) as synonymous with scopola carniolica. This accords with the Kew Index, Vol 4, p. 85c.

† Chemist and Druggist, May 23, 1892, p. 771.

scopola as against 0.50 for belladonna.* This comparative uniformity in content of active principle is a most important feature. The root of atropa belladonna has been shown by the results of different analysts to vary from 0.22 to 0.75,† and from 0.3 to 0.8,‡ showing a variation of about 200 per cent. Our results for scopola would, it is true, naturally be more uniform, each assay representing a large amount of the rhizome; but it is evident that scopola will, as a rule, run better than atropa belladonna, considering both uniformity and strength.

Prof. W. A. Puckner§ recently reported assays of belladonna leaves, all samples being purchased as the best obtainable, which show a variation of from 0.01 to 0.52 per cent. alkaloid, the stronger being 5000 per cent. higher than the weaker. Our results in working atropa belladonna leaves in a large way for the purpose of preparing a plaster as nearly official as possible have convinced us that in both uniformity and strength they are much inferior to either belladonna root or scopola rhizome, and we believe that 0.4 per cent. alkaloid may be considered a fair average for good belladonna leaves.‖

In writing on the leaf and root of atropa belladonna, Dr. E. R. Squibb,¶ many years ago, claimed the latter to be much superior and advised dropping the former. This advice holds good to-day.

Considering the best two drugs for belladonna preparations (for external use), the rhizome of scopola and the root of belladonna have more in their favor and show less practical and apparent differences than do the root and leaf of belladonna. The advantage of two drugs over one, provided they are practically equivalent, requires no argument, the total supply being greater and consequently the price less for each.

As to the suggestion to change the pharmacopœial definition so as to sanction the use of scopola as an alternative, there seems to be no practical

* Two samples of scopola reported in connection with the work of the London Research Laboratory, referred to, assayed 0.43 and 0.51, and are compared with assays of belladonna root previously made by the same chemists, which showed 0.35, 0.38 and 0.39 per cent. alkaloid.

† Simonson, Proceedings A. Ph. A., 1889, p. 120.

‡ Lyon's "Assay of Drugs," 1899, p. 108. This authority gives 0.55 per cent. alkaloid as the average for belladonna root.

§ Pharm. Review, 1898, p. 324. Druggists Circular, Dec. 1898, p. 295.

‖ Prof. F. X. Moerk, American Journal of Pharmacy, July, 1899, p. 325, reports six assays of belladonna leaf averaging nearly 0.5, the lowest being 0.36, and the highest 0.63 per cent. alkaloid. Dr. Lyons ("Assay of Drugs," p. 108) says belladonna leaves range from 0.2 to 0.5 per cent. alkaloid, averaging 0.35. Mr. Burt E. Nelson (Druggists Circular, Aug. 1899, p. 173) gives the average strength of belladonna leaves at 0.35 and that of belladonna root 0.45 per cent. alkaloid. Messrs. LaWall and Pursel (Am. Journ. of Pharmacy, Aug., 1899, p. 394) give the average strength of belladonna leaves at 0.3525.

¶ Ephemeris. Vol. II (1884–85), p. 853.

objection. A pharmacopœial title does not assume to botanical or scientific accuracy, as shown in the case of Rhus toxicodendron and Prunus Virginiana. A proposition somewhat similar has been made in reference to aloes by the A. Ph. A. Committee of Revision, it being advised to admit under the common title "aloes" the drug as obtained from different plants and to require an aloin standard. In the Japanese Pharmacopœia scopola is official and atropa belladonna is allowed to be used as an equivalent, the latter not being given a title of its own. This is a parallel case, except that the position of the two drugs is reversed, scopola* in this case having the preference.

The recognition of scopola on its merits and the dropping of belladonna leaves on account of relative inferiority would seem a very practical and desirable change. Available supply and peculiar adaptability for standardization are points which cannot be ignored in taking a practical view of the question.

Now as to the ethics of the case: while the writer believes any standardized galenical preparations made from scopola much superior to unstandardized preparations made from belladonna, and fully equal to standardized preparations of the official drug, he would, from an ethical standpoint, answer the first portion of the query in the negative, except as it applies to the plaster. In this one instance exemption from strict ethical ruling may be fairly claimed. As every pharmacist knows, there has been practically no such thing as an official belladonna plaster made or sold for the last twenty years or more, pharmacists having willingly relegated the making of belladonna plasters to the large manufacturers, who have produced a superior article in rubber combination. The U. S. P. directs extract of belladonna leaves to be used in making belladonna plasters. The writer knows of but one manufacturer making a leaf extract belladonna plaster. This maker has for years produced a plaster (standardized to 0.4 per cent. alkaloid) from leaf extract of belladonna, merely with a view to being as ethical as is consistent with producing a commercially satisfactory article. This, to the best of the writer's knowledge and belief, is the only plaster made in this country with the official drug. The same manufacturer supplies the British market with plasters prepared from extract of atropa belladonna root (standardized to 0.5 per cent. alkaloid) to comply as nearly as possible with the directions of the new British Pharmacopœia. This, however, is not an official plaster but a plaster of official strength, the mass being unofficial. In this country a plaster prepared from scopola extract by the same maker and standardized to 0.5 per cent. alkaloid is preferred to the one made from the official drug. In commenting on analyses made by disinterested experts in this

* Dr. Holmes (Ph. Journ. & Trans., 1889, p. 471) notes that the differences between Scopola carniolica and Scopola Japonica are very slight.

country, Canada and England, which showed belladonna plasters bought on the open market to assay from nothing to a little over 0.50 per cent. alkaloid, the claim has been made that, if the full strength goods were prepared with scopola extract, the lowest plaster on the list, if made from extract of atropa belladonna, would be more of a belladonna plaster than the highest. Ethics, without alkaloid, should be genuine ethics. The defenders of low-strength goods fall back upon the pseudo-ethical position of using the official drug, when they claim to use the root, notwithstanding that the leaf is official. They would not think of claiming a tincture of belladonna made from belladonna root to be U. S. P. even if prepared with the official menstruum, and yet they claim an ethical position for a plaster prepared not only from other than the official drug, but with other than the official mass. In other words, the plaster is unofficial clear through, barring active principle, when such is present in fair proportion.

In 1890, the writer explained in detail, before this Association, the use of what was commercially termed Belladonna Scopolia (Scopola Carniolica) in preparing belladonna plasters, advocating the alkaloidal standard of 0.5 per cent. The paper was received without criticism, and the standard then proposed has since been adopted by the British Pharmacopœia for plaster prepared with extract of belladonna root. If we take what was sold Prof. Puckner as prime belladonna leaf, and found to assay 0.01 per cent. alkaloid, prepare from it an extract, and from this a plaster according to U. S. P. directions, we may have what would be called by some an official belladonna plaster, judged from a purely ethical standpoint; but it would be admittedly valueless. Here the letter of the Pharmacopœia would be observed; but the spirit of the work would be ignored. On the other hand, if we prepare a plaster from scopola extract standardized to the average strength of good belladonna, and containing the same alkaloids, we carry out the spirit but not the letter of the Pharmacopœia, and the result is full value. By whom is the letter of the official formula observed? Is it observed by any one?

It will doubtless be conceded that a standardized scopola preparation is better than an unstandardized article prepared from atropa belladonna, on account of the far greater uniformity in content of active principle upon which the therapeutic value depends. Doubtless the next Pharmacopœia will adopt an alkaloidal standard for belladonna plaster. Scopola must then meet belladonna on even ground. In the writer's opinion, enough has been said to show that from every practical standpoint the advantages will still be strongly in favor of scopola rhizome as against belladonna leaf, and slightly in favor of scopola in comparison with belladonna root. A plaster which is all that the official article can be—incomparably more uniform than it has been—merits the name belladonna plaster, and no trouble for over ten years has arisen, or can arise, from such being accorded to it.

To say that it is unethical for the pharmacist to supply, under a pharmacopœial name, a plaster which is not official, is to say that his position is never ethical in dispensing any medicated plasters named in the Pharmacopœia unless he makes them himself by the official formulas, which he rarely, if ever, does. We can hardly concede that a custom, which meets with the sanction of the medical profession, and has been the usage in pharmacy for so many years, is unethical in any reasonable sense.

Let us compare the principal ingredients of the official and unofficial formulas for belladonna plaster, and see where the line should be drawn:

A.	B.	C.	D.
Official drug, Official mass.	Official drug, Unofficial mass,	Unofficial drug, Unofficial mass.	Unofficial drug, Unofficial mass,
Ext. bell. leaves (extractive and alkaloid), Resin plaster, Soap plaster.	Ext. bell. leaves (extractive and alkaloid), Rubber, Pitch, olibanum, etc.	Ext. bell. root (extractive and alkaloid), Rubber, Pitch, olibanum, etc.	Ext. scopola (extractive and alkaloid), Rubber, Pitch, olibanum, etc.

Obviously A alone can claim to be official. A and B only can claim the official drug. C and D are unofficial, with exception of the alkaloid. If the proper alkaloid is present in each case, why should we seriously consider a slight variation in the inert extractive matter, when much greater differences are universally allowed in more important ingredients? Having by common consent broken away from the pharmacopœial formula, the place to draw the line is at the active principle, and the plaster which contains it in proper proportion merits the name of the preparation, the requirements of which it meets in every practical way. On the other hand, a plaster containing but a trace of alkaloid does not deserve the name of belladonna plaster, whatever the botanical source of the drug employed. It is the latter which disappoints both physician and patient, and not the former.

To recognize an article as belladonna plaster simply because it is made from "belladonna," when the drug, and consequently the plaster, may vary to hundreds or thousands per cent., while declaring a standardized scopola plaster unworthy of the same title, is to needlessly sacrifice virtue and practicality, to worship a name and ignore therapeutic value, to place an ill-conceived notion of pharmaceutical ethics above a rational view of practical medicine, in short to exalt an obviously inferior over an admittedly superior preparation. This never has been and never will be the design of the Pharmacopœia.

If demonstrated merit wins, the next Pharmacopœia, by granting to scopola official recognition, will make ethical the employment of a most

valuable drug which in every practical way is an equivalent of atropa belladonna, at least so far as relates to external preparations. The writer believes that the second portion of the query should have an affirmative answer, because the active principle, upon which the therapeutic action of belladonna depends, is yielded in larger proportion and with greater uniformity by scopola than by either the leaf or root of atropa belladonna, and because the results of clinical tests were favorable to scopola.

The object of the writer has not been to present the results of further original investigation, which might be viewed as savoring of prejudice in favor of a position previously taken; but to direct attention to the obviously disinterested statements of standard authorities, directly bearing upon the merits of the question, and which are easily accessible to the pharmacist for verification.

Mr. Ruddiman took the Chair while Dr. Rusby read his paper as follows:

THE INTRODUCTION OF SCOPOLA TO THE U. S. P.

[An Answer to Query No. 5, "Is it proper to make Belladonna preparations from Scopola in the face of the present U. S. P. definition? Should the U. S. P. change its definition so as to sanction the use of this rhizome as an alternative?"

BY H. H. RUSBY.

As a member of the Committee on Scientific Papers, the writer introduced the above query in his personal interest, desiring to offer a contribution upon the subject. Before his paper could be written, the one which has just been read was handed in, and was found to contain the greater part of what was intended for introduction to this one. The latter is thus restricted to such matter, chiefly botanical and pharmacopœial, as has been omitted in the preceding paper.

It appears that the Pharmacopœia is quite ignored in the use and manufacture of belladonna plasters, except that an official plaster is offered for any such as may desire it and as a mere matter of nominal and formal compliance. In other words, the official plaster, not being acceptable, is not generally offered or employed. It appears further that various grades or degrees are recognized in the violation of the code, differences of opinion existing as to whether the use of Scopola, or that of belladonna root, is the more reprehensible. The manufacturers are thus anxious for the Pharmacopœia to amend its provisions and to declare what drug shall henceforth be used for this purpose. Inasmuch as such a change will remove any ethical ban which now exists against either article, the inquiry by the Pharmacopœia Committee becomes one for determining which article is the better for the purpose, or whether both are equally good. An investigation being thus instituted, it can with equal convenience be extended to all the other preparations and uses of the two drugs.

The discussion of this question has been thus far conducted chiefly by interested manufacturers. It is not suggested that these manufacturers

are either incompetent or disinclined to publish the exact facts, but with many persons such contributions do not carry the same conviction as those coming from purely disinterested sources. Hence it is believed that a thorough investigation of the subject should be instituted. No place seems so suitable for such an investigation as the Scientific Section of the American Pharmaceutical Association, and it is intended to present at our next meeting all the facts which can be ascertained in regard to it. The present contribution is made merely to outline in a systematic way the several subsidiary subjects which require investigation, in the hope that other members may find it convenient to participate in the work. The questions which present themselves as requiring solution are as follows:

1. What are the alkaloids respectively of belladonna leaf and root and of scopola rhizome as they are offered in the market? It is not necessary for the present purpose to inquire what these alkaloids may be in the living plants.

2. How do these alkaloids vary in character and amount in different forms of the drug as to age, size, processes by which cured and other similar conditions?

3. What changes do these alkaloids undergo in the ordinary processes of manufacturing the different preparations? Does the extraction change hyoscyamine to atropine, or is there any change resulting in the production of or destruction of scopolamine?* Similarly, what change is effected in these alkaloids during the time that a plaster is lying in contact with the body, exposed to its heat and secretions, or while lying in the gastro-intestinal canal, or after absorption into the blood? That is, do such changes occur that when the drug comes to act upon the system or upon certain parts of it, the effects are the same, no matter which alkaloid was originally introduced?

4. How far does scopolamine differ from either or both of the others? How much of it is there in scopola rhizome, and is there any of it in belladonna, root or leaves?

5. What are the conditions as to market supply of the several drugs in regard to extent and price?

Any endeavor to answer our main query except through a thorough investigation of these subsidiary points must be very largely in the nature of speculative reasoning.

What present information have we bearing upon them?

The present state of our knowledge (and the term "opinions" would

* Throughout this paper, the term "scopolamine" is regarded as the equivalent, for all practical purposes, of *hyoscine*, of which the former alkaloid constitutes the principal part.

better apply to a large part of it) has been fairly presented by Mr. Williams. The composition of belladonna leaf and its preparations and of belladonna root and its preparations is markedly distinct. That these differences are to some extent in kind or quality is indicated by the strong and peculiar odor of the leaf preparations, which is not present in those of the root. The principle which so strongly affects the sense of smell must be diffusible, and ought to have an important bearing upon the physiological action of preparations used either internally or externally, especially the latter, where the ordinary alkaloidal constituents of the root are absorbed to a very limited extent. This difference may be favorable or unfavorable to the employment of the leaf preparations, and for some or all of its uses, and this point requires investigation.

The chief differences between these two are perhaps in regard to percentage of constituent or degree of activity. Considered in this light, the leaf is so extremely variable as to make it doubtful whether it be fit for use at all, except under new official conditions as to definition and description. The purchase of belladonna leaves under present conditions for use in the making of standardized preparations is likely to result in a total loss to the purchaser. Whether definition and description can be so modified as to ensure us a more uniform commercial article, is the subject upon which we have at present practically no information, and this it is hoped to investigate during the coming year in the economic department of the New York Botanical Garden.

Concerning the quantity of alkaloid in belladonna root, no reference is necessary to other than botanical facts to establish its variability. Its alkaloid is chiefly in its bark. The root is perennial, and as it grows in thickness, its bark does not keep pace with its woody cylinder. The variation in relative weight of these two parts is even greater than that in thickness, as the cylinder becomes very woody, after which it loses much less weight in drying than when younger, while the bark changes but little in this particular, hard bast-fibres being practically absent. Wide variation in percentage of alkaloid at different ages is thus a simple physiological property of the part. As to its variation at different seasons of the same year, we are not so well informed.

As to the kind of alkaloid in belladonna root, our evidence renders it very probable, if not actually established, that it is different in the young root, when more hyoscyamine is present. The presence in it of scopolamine has at various times been claimed, but is upon the whole improbable.

Pursuing a similar line of inquiry as to the composition of scopola rhizome, we find the form and character of its growth to render it equally certain *a priori*, that it would be of pretty uniform composition, at least very much more so than in the case of either of the others. This rhizome grows very rapidly both in length and thickness up to a certain time,

when its growth in thickness practically ceases. Its habit as to longitudinal extension does not seem to have been accurately described, but judging from the appearance of large quantities of the drug which have been examined, its length appears to be pretty regularly limited. It appears to belong to that class of rhizomes which, as they extend at the forward end, decay at the posterior, so that it maintains a length quite uniform within fairly narrow limits. This practical uniformity in dimensions would eliminate the chief element of variation which we have found in the composition of belladonna root. When we turn to the results of assays and of manufacturing operations, we find this assumed variability in the one and uniformity in the other, abundantly confirmed, as Mr. Williams has already shown.

As to the kind of alkaloid in scopola, we know that it is largely hyoscyamine, some atropine and an amount of scopolamine of which we are quite in doubt. Our large manufacturers, working the rhizome in a manufacturing way, claim that scopolamine is one-tenth of the total alkaloid present, while very high authority, working by laboratory assays, finds it so small an amount as to be hardly appreciable.

Upon this point, some light is thrown by the natural relationship of the plant to henbane. Its fruit, in the form of a circumscissilly dehiscent capsule, allies it closely with that plant, in spite of any superficial resemblances in the form of its leaves to belladonna. We therefore naturally look for hyoscyamine, and an appreciable amount of scopolamine.

As to the changes undergone in the alkaloids in manufacture, there is high authority for the belief that in the case of belladonna, the hyoscyamine changes mostly into atropine, and that this is the source of the atropine, either in its manufactured products or in the products of assay. As to what happens in scopola in the process of manufacturing, we have no positive information, but we should naturally look for a similar change, and there is strong reason to believe that the atropine of artificial production upon the market is in great part obtained from this source. We have at present no reason to believe that any change occurs in the scopolamine. Concerning possible changes in the character of alkaloid occurring while preparations are upon or within the body, the subject has to be taken up *ab initio ad finem*.

How far does the action of scopolamine differ from that of either of the other alkaloids? It is certain that this inquiry must be pursued separately for the external and for the internal uses of the drug. As to the latter, we know it to be markedly different, particularly as regards the cerebrum. As to the former, we have really no evidence to show that it is.

Regarding the future of commercial supplies, our reasoning must be chiefly speculative. Up to the present, scopola has been in more abunddant and cheaper supply than belladonna, and it is easier to obtain it of good quality. Should its use be authorized, the question arises whether it

would become scarcer, dearer, and less regular in supply? Upon the other hand, we have to consider that it has been, in all probability, generally employed by all manufacturers of belladonna plasters, in which case a discontinuance of such use would throw a heavy strain upon the belladonna market, sufficient to quite unsettle it. On the whole, it would appear desirable, considered from this point of view alone, to draw upon the available supplies of both drugs, should therapeutical considerations lead to such a possibility.

A careful weighing of the above facts makes sufficiently clear the desirability of finding a method for utilizing the scopola, and fully justifies all reasonable effort in the investigation of the subject. Should the results of such investigation be found not to justify its use, it will become the duty of all manufacturers to submit cheerfully to the facts, and to conclude that their own best interests are common with those of the public whom they serve Should a contrary result be reached, all should unite in finding a suitable way for authorizing the use of the new article. Above all, let there be no more attempts to misrepresent and defame the Committee of Revision of the U. S. Pharmacopœia, whose efforts are as truly and highly of a mission ary character as those of any body of men who were ever associated.

It need not be supposed that any formal obstacles could intervene to prevent the adoption of scopola, were such action found desirable. If it transpired that certain of the preparations or uses of the two drugs were distinct enough to render them different therapeutic agents, both drugs could be introduced, and under each could be specified such preparations as were thus distinct, while such preparations as were practically identical could be defined as proceeding from either drug at the pleasure of the maker. That is to say, we could have both belladonna root and scopola rhizome named, defined and described in the Pharmacopœia, and then, after presenting the formula for belladonna extract, for example, we could say "or the extract may be similarly prepared from scopola." If upon the other hand it were found that the extracts of the two differed for their internal use, while for their external use they were identical, the extracts could be specified under each drug, and then, after the formula for belladonna plaster, we could say, "or the plaster may be similarly prepared from extractum scopolæ." If finally the two drugs were found practically identical in all regards, not the slightest essential impropriety, in spite of some incongruity, would be involved in defining "Belladonna" as "the root of Atropa Belladonna, or the rhizome of Scopola Carniolica."

This paper is by no means to be regarded as an assumption that such action as here outlined will be found desirable. So far as we are justified in entertaining an opinion on the grounds of present information, I am personally inclined to believe that such is the case, but the object of this paper is merely to outline the investigations that are necessary in order to reach a conclusion, and the possible methods of procedure.

It may not be out of place, before closing, to point to this subject as evidence of the necessity of introducing the study of the physiological action of drugs as a department of purely pharmaceutical research, and also as enforcing the argument made in the address of the chairman in favor of a highly scientific character in the work of our Association.

I would also plead before closing, more especially with our large manufacturing chemists, for the use of the correct name *Scopola Carniolica* Jacq. as displacing the frequently used generic synonym *Scopolia* (which refers to an absolutely different plant-genus) and the specific synonym *atropoides*, which violates all the generally accepted rules which it is the duty of scientific people to observe. Mr. E. M. Holmes, in the paper cited by Mr. Williams, has so fully set forth the facts bearing upon this point, that it is neither complimentary to him nor true to one's own knowledge of the facts to vary from the usage recommended.

The reading of the paper was applauded.

Mr. Puckner not being present, the Secretary read his paper as follows:

THE ASSAY OF HYOSCYAMUS.

W. A. PUCKNER.

Being called to report upon the alkaloidal content of a considerable number of specimens of henbane, a series of experiments were undertaken incidental to the selection of a method of assay.

Believing the data so obtained to be of some interest, they are briefly noted down in the following.

The writer has elsewhere * communicated upon the excellence of the assay-method of Keller and its special adaptability to drugs containing alkaloids easily decomposed. At the same time attention was called to an inaccuracy inherent in the method, namely, the employment of an aliquot portion of the ethereal solution containing the alkaloids extracted from the drug, a source of error small in most cases but assuming appreciable dimensions when it is necessary to operate upon relatively large quantities of drug, as is the case with belladonna leaves, henbane, etc. And recently F. X. Moerk † also working upon belladonna leaves has again demonstrated the probable error of the method. In my communication above referred to, a slight modification of the Keller method was suggested whereby, instead of using an aliquot portion, complete exhaustion of the drug was aimed at, otherwise the procedure remaining as in the original method.

While the Keller method thus modified seemed eminently adapted for the assay of henbane, adverse criticism of the original method by Beckurts ‡

* Pharm. Review, 1898, vol. 16, 180.

† Am. J. Phar., 1899, vol. 71, 105.

‡ Proc. A. P. A., 1895, vol. 43, 535, from Pharm. Centralh., 1894, 566. According to

made it desirable to compare the results obtained with those yielded by other assay methods.

The writer regrets that in the literature accessible to him Beckurts' method as applied to the drug itself was not given in sufficient detail to permit a comparison with the Keller process as modified by him. However, K. Schwickerath * communicates results of an assay of henbane which according to Beckurts' method contained 0.074 per cent. of alkaloids while his own method indicated 0.088 and 0.082 per cent., and a trial of this method will, therefore, also afford a comparison of Beckurts' process.

In carrying out the assays according to this method, close adherence to details was aimed at with one exception, namely, while Schwickerath digests 40 Gm. of drug with 200 Cc. of "weak Prollius fluid" and takes 100 Cc. of this to represent 20 Gm. of drug, the writer digested 20 Gm. with 100 Cc., then transferred all to a percolator and completed exhaustion with a further 100 Cc. of menstruum and thus avoided the use of an aliquot portion. The alkaloidal residue obtained in six determinations required upon titration the following amounts of decinormal acid solution : †

(a) 0.45 Cc. (b) 0.52 Cc. (c) 0.04 Cc. (d) 0.81 Cc. (e) 0.45 Cc. (f) 0.42 Cc.

It was noted after the extraction ("perforation") of the alkaline aqueous solution of alkaloid with ether that the flask containing this ether also contained drops of some liquid immiscible with ether, and which, seemingly, was water ; and hence, in the evaporation of this liquid previous to titration, it was attempted to conduct it in such a way that the water should have disappeared simultaneously with the ether. Accidentally C was left in a strong draught over night, and the dry residue when titrated the next

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this abstract Beckurts in a comparison of the various assay methods upon a number of drugs, finds that, while generally the Keller method is eminently satisfactory and to be preferred over other methods, when applied to henbane the results are low, a drug yielding with Beckurts' method 0.08862 per cent. gave according to Keller only 0.0712 per cent. These figures are as they appear in the Centralhalle, while in the Apotheker Zeitung, 1894, vol. 9, 660, from which the Centralhalle appears to have abstracted, the figures under D and E are transposed, thus :

B	C	D	E
.09537	—	—	—
.08862	.0896	.0712	.09
.08959	—	.0722	—

according to which the Keller process (designated E) gave higher results than other methods. Whichever may be correct, Beckurts concludes that "the estimation of the alkaloidal content according to Keller's method here becomes difficult on account of the small amount present."

* Pharm. Rund., 1893, vol. 11, 282.

† Decinormal solutions were given preference over weaker ones as they seemed to give sharper end reactions. To obtain accurate readings burettes graduated in 0.02 Cc., and easily permitting a reading to 0.01 Cc. were used.

morning required but 0.04 Cc. of decinormal acid. Similarly, D was also evaporated in a strong draught, and thus more water introduced by condensation of moisture from the atmosphere : in this case the aqueous solution was titrated as soon as all ether had disappeared, and the high result, 0.81 Cc. of the acid, no doubt, is due to ammonia still being retained by the watery solution. Rejecting C and D, the average volume of decinormal acid required to neutralize the alkaloidal residue from 20 Gm. of drug was 0.46 Cc., and taking 1 Cc. of decinormal acid to represent 0.0288 Gm. of alkaloid, the drug would contain 0.66 per cent. Previous assays of the drug used in the preceding by other methods having indicated a larger alkaloidal content, it became desirable to ascertain the cause of the low results obtained.

Accordingly, a solution of atropine sulphate was prepared, 10 Cc. of which was calculated to contain 0.0209 Gm. atropine alkaloid. Portions of 10 Cc., diluted with 40 Cc. 1 per cent. hydrochloric acid, made alkaline with 5 Cc. 10 per cent. ammonia water, and extracted with 10.10 and 10 Cc. of chloroform yielded alkaloidal residues requiring for neutralization 0.68 Cc. and 0.71 Cc. of decinormal acid, corresponding to 0.0196 and 0.0204 Gm. atropine, demonstrating the correctness of the solution, and also, incidentally, that no trouble is experienced in extracting atropine from a comparatively weak aqueous solution. Next, 10 Cc. of the same solution was measured into a "perforator," rendered alkaline with 1 Cc. of ammonia water, and extracted with 50 Cc. of ether U. S. P. for three hours. Again, the receiving flask contained some liquid immiscible with the ether. While in the determinations above referred to accidental carrying over of water from the perforator was suspected, in this case it was guarded against by placing a plug of cotton above the aqueous solution. Further, while the solution of the perforator was colored with cochineal, the liquid in the flask was colorless. It would therefore seem that this contamination is unavoidable, and is probably to be ascribed to the solvent action of ether on water.

The larger part of the ether was now distilled off, the flask with the remaining liquid put in a warm place (25–30° C.) and frequently rotated until perfectly dry ; placed over sulphuric acid over night, and then titrated in the usual way. Of decinormal acid, 0.60 Cc. were required, corresponding to 0.0173 Gm. alkaloid, as against an average of 0.0200 Gm. obtained when extracted with chloroform.

A second experiment was conducted in the same manner, except that the ethereal liquid was allowed to evaporate spontaneously over night. A few drops of watery liquid remaining in the morning being carefully evaporated, the residue was found to require only 0.17 Cc. of decinormal acid.

To demonstrate that the low results of my henbane assays were caused in a similar manner, two further assays of the drug were made, following Schwickerath's method up to the perforation with ether. Instead, the acid

solution was transferred to a separator, rendered alkaline with ammonia, and extracted with chloroform in the usual way. Two determinations were made in this manner, and the residues so obtained required 0.65 Cc. and 0.61 Cc., an average of 0.63 Cc. of decinormal acid, and indicating 0 91 per cent. of alkaloid. This last figure closely corresponding to that yielded by the Keller modified process, presently to be described in full, no further experiments were made with the Schwickerath process, since, even if the decomposition of alkaloid in the last step be avoided, as no doubt can be done, there seemed to be little prospect of obtaining a larger yield of alkaloid than with other less complicated methods.

F. X. Moerk,* in his work on belladonna leaves, adopted a method similar to that of A. W. Gerrard.† Briefly outlined, Moerk directs the exhaustion of the drug with a menstruum of alcohol 2 volumes and water 1 volume, by means of percolation with intermittent maceration. The total percolate is brought to the consistence of a soft extract, dissolved in a light chloroform ether mixture (ether 4 parts, chloroform 1 part by weight), and this then extracted with acidulated water, the watery solution rendered alkaline and extracted with a heavy ether-chloroform (ether 1, chloroform 2 parts by weight), the emulsion here forming being broken up by the addition of stearic acid. The solvent is distilled off, and the residue titrated in the usual manner. In applying this method to the assay of henbane, the directions of Merck were closely adhered to with one exception: in the final extraction of the alkaloid pure chloroform was substituted for the ether-chloroform mixture, thus avoiding the formation of an emulsion, and with it the addition of stearic acid. The alkaloidal residue from 20 Gm. of drug required 0.65 Cc. of decinormal acid. In a duplicate determination, 0.60 Cc. were used. The average, 0.63 Cc., indicates 0.91 per cent of alkaloid, and corresponds to the yield obtained with Schwickerath's altered method.

The assays after Keller's method were carried out as follows: To 20 Gm. of henbane, dried over sulphuric acid, reduced to a No. 40 powder and contained in a short-necked flask, are added 100 Cc. of chloroform-ether mixture (chloroform, 20 Cc.; ether, U. S. P., 80 Cc.), and, after standing for a few minutes, 10 Cc. ammonia water, U. S. P., then the flask well corked and shaken thoroughly and frequently for one hour. At the end of this time the mixture is transferred to a small narrow percolator (improvised by drawing out a piece of glass-tubing or a large test-tube, about 25 Mm. in diameter) provided with a plug of cotton at the outlet and the percolate received in a separator. When nearly all of the liquid has passed through, the drug is packed down rather firmly by means of a glass rod. When the liquid no longer drops from the percolator, 25 Cc. of the same chloroform-ether mixture is poured upon the drug remaining

* Amer. J. Pharm., 1899, vol. 71, 105. † Yearbook of Pharm., 1890, 347.

in the flask, and with it the remainder of the drug transferred to the percolator. When this liquid also has passed, a further 25 Cc. of the same menstruum is used to complete the extraction. The united chloroform-ether solution, containing the alkaloid from 20 Gm. of henbane, is now extracted successively with 10, 10, 10 and 10 Cc. of 1 per cent. hydrochloric acid. This acid solution, which has been received in a second separator, is rendered alkaline with 5 Cc. ammonia water, U. S. P., and shaken with 20, 10 and 10 Cc. of chloroform. The chloroform, as it is drawn off, is passed through a small pellet of cotton, to retain any water accidentally carried over, into a shallow beaker and evaporated at a temperature of 25° to 35° C. When all has evaporated, the residue is dissolved in 5 Cc. of ether and again brought to dryness. In the residue the alkaloid is determined by adding ether 2–3 Cc., cochineal test-solution 3–5 drops and decinormal acid in slight but distinct excess, and after complete solution has taken place and the ether which was added to assist in the solution of the alkaloid has evaporated, determining the excess of acid with decinormal alkali. The number of cubic centimeters of decinormal acid combined with the alkaloid, multiplied with the factor 0.0288, indicates the weight of alkaloid, calculated as hyoscyamine, in 20 Gm. of drug.* In three assays carried out according to this procedure there was required of decinormal acid: (*a*) 0.66 Cc.; (*b*) 0.62 Cc.; (*c*) 0.65 Cc.; the average, 0.64 Cc., corresponding to 0.92 per cent. of alkaloid. This result agrees entirely with that obtained with the method of Moerk, and also with the slightly modified Schwickerath method, and would seem to satisfactorily demonstrate the reliability of the method. And since determinations according to it consume less time and require less attention and care, it was adopted for the assay of henbane.

Discussion upon the papers just read was invited by the Chair:

MR. CASPARI: The question presented in the first two papers is one that will, probably, largely engage the attention of the Committee of Revision and Publication of the Pharmacopœia, and it is to be hoped that full attention will be given the matter and that scopola will be introduced into the Pharmacopœia, if for no other reason than to do away with the very annoying condition existing at the present time in the matter of commercial belladonna plasters. I have been called on to assay a number of these plasters, and have found them to vary greatly in alkaloidal strength. Inasmuch as the manufacturers, probably with the consent of the physicians, are using scopola extracts now in the production of these plasters—I believe it is an acknowledged fact—it is far better that scopola be officially recognized, and that the Pharmacopœia give these manufacturers license for its use. In a recent paper by Pinner, printed in the Zeitschrift für Augenheilkunde, the identity of the pharmacological effects of scopolamine and atropine was pointed out; and while chemically they differ, these two alkaloids may be used

* Since the drug has been dried over sulphuric acid, in order to obtain the alkaloidal strength of the same as submitted for assay, loss of weight in drying must, of course, be considered. In the assays here reported this has been neglected, since comparative results were all that was desired.

indiscriminately. The very fact that the two drugs appear to be identical, or practically so, in their medicinal effects, is an argument for the admission of scopola to the Pharmacopœia. The question viewed from a botanical standpoint is one that very few of us, I take it, are able to cope with.

MR. HALLBERG: I think we are much more at sea with reference to the Pharmacopœia belladonna plaster than we are as to the identity of scopola and belladonna in this case. This whole controversy has been precipitated by the manufacturers of belladonna plasters, and the gist of the arguments on either side is, that they are not made according to the Pharmacopœia method. What have these rubber plasters to do with the official belladonna plaster? They say that the physician uses the scopola and belladonna plaster promiscuously. That is past history. The physicians do not use the official belladonna plaster any more. They cannot get the official plaster, and the rubber belladonna plasters are comparatively worthless. It is a waste of an excellent medicinal agent to use it in the form of a plaster with a rubber combination. This question involves therapeutic considerations, and I think it is exceedingly important, and I want to state the position I hold with reference to this question. Except the adhesive and capsicum plasters for purely local effect, plasters are not used by the physicians any more, practically. The medicated plasters are used scarcely at all since the introduction of these rubber plasters, because they require a sub-cutaneous action—a thereapeutic or systemic effect—and you can get no absorption of the proper kind from belladonna when the plaster is made with an entirely unabsorbable substance like rubber. It is quite a different thing to use a lead plaster, which will penetrate through the skin and cause a gradual absorption of the medicinal agent through the system, as well as having a local effect. In fact, medical men tell me that the use of these rubber belladonna plasters sometimes produces a most serious disturbance, to the extent of poisoning the system. I recollect one case where the patient's eyes were badly affected from their use. I think it is almost a travesty on pharmacy, and almost an impeachment of the aims and methods of this Association, that we should permit to go unchallenged this perversion of the use of such a valuable, old-time preparation as the medicated plaster to this worthless India-rubber combination—with a few exceptions—that I have mentioned. For purely local effect the rubber answers well enough, but not for medicinal effect. I am in favor of incorporating an official title designating that plasters of this character shall be such as are made with an absorbable vehicle—lead, or whatever it may be—so we will put a stop to this substitution which has been going on for so many years.

DR. STEWART: I should like to ask Mr. Hallberg how a rubber belladonna plaster could produce a poisonous effect on the system, and still not be absorbed.

MR. HALLBERG: The medical men have explained it to me very clearly and lucidly, but I cannot myself go into the question of its physiological effect and explain it. They have shown that it can be done, without producing the effect they wanted for the peculiar local trouble that the belladonna plaster was intended for. It was because of the peculiar untoward effect upon the blood. Such effects are to-day a recognized fact, and must always be taken into consideration in treating a case. This question of the idiosyncrasies of the blood under the influence of medicine, is recognized by the highest authorities.

MR. CASPARI: Do I understand the speaker to say that these rubber belladonna plasters are not used by the medical profession? I think it is altogether possible that a plaster made with a rubber base properly prepared, may be fully as effective as one made of lead, plaster and resin. I think the last speaker's own statement of the marked mydriatic effect on the eyes shows that. I have seen some wonderful indications of belladonna, by using the rubber belladonna plaster.

MR. WILLIAMS: Prof. Hallberg has said that physicians have discontinued the use of rubber combination belladonna plasters. I believe there are more used now than ever before, but I do not know the exact proportion used by physicians. I do not think it is possible for such a plaster, placed on a man's back, to decidedly affect his eyes, unless there is a marked absorption. That indicates a systemic effect, not a local effect, and the local effect is usually what is wanted. In other words, there was even a greater effect in the case cited than was desired. I do not see how the rubber plaster can be assailed in the way it has been, for the number of lead-base plasters used is extremely small. It is a rare thing, as every pharmacist knows, to have a call for one. It seems to me that the long employment of the rubber-combination belladonna plaster, and the apparent satisfaction to all, is a sufficient refutation of such a sweeping charge as we have had here that they are absolutely useless, and ought to be discontinued. There is a considerable amount of pitch, olibanum, etc. in the rubber-combination plasters. It is not merely a combination of ground orris and rubber.

DR. RUSBY: So far as my paper is concerned, Prof. Hallberg has not touched me at all, for the reason that I said the Pharmacopœia was practically ignored in the manufacture of these plasters.

On motion of Dr. Reed, the three papers last read were received and ordered to take the usual course.

Dr. Bartley read in abstract a paper on the Identification of Organic Substances Used in Pharmacy and Commonly Met with in Commerce, but explained that he had not been able to complete his work satisfactorily, and asked that he be allowed to withdraw his paper for completion and publication next year. The permission was granted.

MR. MAYO: I would commend this paper as an undertaking of very great value, and I am not surprised that the Doctor felt a little discouraged at being unable to complete the line of investigation, though I am glad he did not allow that to prevent him from presenting this paper to the Association at this time.

On motion, the following paper by Mr. Joseph Feil was read by title only, the author being absent:

A NEW PROCESS FOR THE PREPARATION OF SPIRIT OF NITROUS ETHER.

BY JOSEPH FEIL, PH.G.

For more than two centuries spirit of nitrous ether has been a standard medicament, and notwithstanding the facts that it rapidly deteriorates in quality, that the method of its production has varied with the appearance of almost every new edition of the U. S. and other Pharmcopœias that the strength in what some British investigators, Prof. Matthew Hay, Dr. D. J. Leech and others, regard as its essential constituents, namely, ethyl nitrite and nitrous acid, varies from the very moment of its finished preparation, and that the various Pharmacopœias require different standards, it yet holds its own as a valuable medicine.

The U. S. P. of 1820 and 1830 had a process taken from the old London Pharmacopœia, which produced a colorless product, yet it must have

been therapeutically effective, and certainly contained much ethylic aldehyde. The 1840 and 1850 U. S. P. gave a variation of the old process, and since then every U.S. P. contained a new or somewhat varied method of preparation. Also the description of the galenical has been changed from time to time until coming down to the recent U. S. P. we have an attempt to produce an alcoholic solution of chemically pure ethyl nitrite.

All processes previous to the last one were eminently practical for the retail pharmacist, but the 1890 process is an absolute impossibility for those who are supposed to need it. The reason is readily seen, ethyl nitrite is a highly volatile and inflammable liquid, boiling at 18°, and dangerous to prepare, except for those who are accustomed to and experienced in the manipulations of practical organic chemistry. All attempts to devise processes on this line must necessarily fail.

I believe the quality of Spt. Eth. Nit. is decidedly inferior to-day, owing to the present U. S. P. method of preparation; it has come about in this way, the process being an impossibility for the retail pharmacist, many tried to conform to it by purchasing ethyl nitrite and dissolving the chemical in alcohol. This procedure is open to two quite serious objections:

1. The ethyl nitrite is probably pure when leaving the laboratory of a reliable chemical manufacturer, but no one has yet discovered a process of preventing its deterioration, and the substance when reaching the retailer through the jobber ranges in strength from forty (40) to sixty (60) per cent. of the strength stated on the label.

2. It requires great care and a fair degree of skill to properly mix the alcohol with it, owing to its extreme volatility, and some loss almost invariably results. As a consequence of the above, it is common to find the average specimen, as found in retail pharmacies, to assay about one per cent. ether instead of four per cent.

With these facts in view, I have been seeking for a process which in the hands of a fairly skilled pharmacist should yield a product of good quality in a reasonably short time in quantities as needed by the average shop.

The objections to recently proposed processes will be found in a paper read by me at the Ohio State Pharmaceutical Association meeting, held at Put-in Bay, in June, and published in the American Druggist, July 25, 1899.

The process here proposed requires about fifteen to twenty minutes' time, and the manipulations are such that any one skilled in ordinary chemical manipulations can easily carry out.

THE PROCESS.

Sodium Nitrite	30 Gm.
Sulphuric Acid	20 Gm.
Alcohol	sufficient.

The sodium nitrite and 300 Gm. alcohol are placed in a liter flask with a two-hole cork or rubber stopper; in one of the openings is placed a

stoppered funnel of any description, the other has a glass tube connected with an upright condenser kept cool with running water.

The sulphuric acid is placed in the funnel, the mixture is then heated until the alcohol is about beginning to bubble, the heat withdrawn and the sulphuric acid slowly added; after action ceases, heat is again applied a moment or two and withdrawn. A second repetition may again cause an action to begin; usually this does not occur, although it is best to try it.

The contents of the flask are allowed to cool and then filtered in a well-covered funnel and alcohol added to make 450 Gm. It is of course preferable to assay the filtrate and then dilute, but a large number of experiments gave very close results at the quantity stated.

NOTES.

An excess of sodium nitrite is intentionally used, as molecular quantities do not act as well practically. While the ethyl nitrite is here produced in solution all attempts to prevent some escape have failed, yet a much larger quantity is obtained than in any other process that I am familiar with. U. S. P. 1890 process, my average yield has been 30 per cent. of the theoretical requirement. Scoville's process, average yield, 40 per cent. My process given above, general yield 75 per cent.

The product obtained by this process conforms to the present pharmacopœial requirements, but has in addition an odor reminding one of the spirit obtained by the U. S. P. 1880 process. The time and attention required is so little and the process safe, that it is well adapted to the essential requirement that spirit of nitrous ether should be freshly made at least every two or three months.

Cleveland, O., August 8, 1899.

Mr. Prescott presented in abstract the following paper:

DOES TARAXACUM OFFICINALIS CONTAIN AN ALKALOID?

BY A. VAN ZWALUWENBURG AND M. GOMBERG.

The active principle of *Taraxacum officinalis* has frequently been the subject of inquiry ever since Gustav Polex, in 1839 (Arch. d. Pharm., 1839, 50), reported the separation of what he supposed to be a distinct individual body—the *taraxacin*. During the last few years Professor L. E. Sayre has been active in the investigation of this well-known drug, and last year reported to this Association the discovery of an alkaloid. This substance, though present in very small quantities, had been obtained by him in a crystalline form from chloroform extract of the dry root.

Professor Sayre has very kindly granted us the permission to repeat the work with reference to the presence of an alkaloid in the drug, and we take this opportunity to express to him our thanks.

As organic solvents are not always free from impurities of a basic nature, we have taken great pains to obtain our reagents as pure as possible. The

alcohol was purified by boiling it for some time with carefully recrystallized tartaric acid, and then distilling it, rejecting the last portion. The ether, chloroform and petroleum ether were first shaken several times with a 10 per cent. solution of sulphuric acid, then repeatedly with water, and dried over fused calcium chloride. The solvents were then carefully distilled, in the case of ether and petroleum ether over phosphoric anhydride. The petroleum ether was collected below 65° C.

The taraxacum roots were collected between October 5th and November 4th, 1898. After removing all leaves and decayed parts, they were washed in cold water and dried in a current of warm air, the temperature not rising above 50° C.

We have made three assays for the extraction of the alkaloid, two on 500 Gm. lots, and one on a four thousand Gm. lot of the drug. The results which we have obtained are briefly as follows:

I. 500 Gm. of the powdered drug were exhausted in a percolator with a 1 per cent. solution of purified tartaric acid in alcohol purified as described above.

The percolate was concentrated under diminishing pressure at a temperature not exceeding 50° C. to a small bulk, and finally to dryness in a vacuum desiccator. The residue was dissolved in a small amount of water, and the strongly acid solution was shaken out three times with ether. It was then made alkaline, and again repeatedly shaken out with ether. The residue from these last ethereal extracts, very small in quantity, and of a pale yellow color, was dissolved in about 5 Cc. water, with the addition of a few drops of hydrochloric acid. The solution gave only very faint precipitates with the general reagents for alkaloids.

II. The second assay was carried on in a manner similar to the first, substituting chloroform for ether. The final product gave again only a faint turbidity with general reagents for alkaloids.

II. Four thousand Gm. of the ground root were extracted in a large continuous extraction apparatus with petroleum ether. The dried drug was then extracted in the same apparatus with chloroform, for over a week. The chloroform extract, concentrated to about 30 Cc., was treated several times with dilute (two per cent.) sulphuric acid. The combined aqueous extracts were then treated successively with barium carbonate and lead acetate to remove the sulphuric acid, and then with hydrogen sulphide to free it from the excess of the lead salt. The filtered solution was concentrated to a small bulk at a temperature below 45° C., made alkaline, and extracted with chloroform. The latter, on evaporation, left an oily residue of a peculiar characteristic odor, about 2 Cc. in amount.

This was dissolved in acidulated water, and, at this stage, gave fairly good precipitates with the general reagents for alkaloids. As the solution was still quite colored, it was decided to purify the supposedly basic principle as far as possible. It was precipitated with phosphomolybdic acid,

and recovered from this combination in the usual manner. It was again reprecipitated, with Mayer's reagent this time, and again recovered from the filtered and washed precipitate. The solution of the "alkaloid" at this stage was fairly pure, but gave only slight precipitates with the general reagents. The whole chloroform extract did not amount to more than about 0.002–0.003 Gm. We have examined the extract at this, and at all previous stages, and were unable to obtain crystalline compounds. All attempts to obtain salts of the "basic" principle by passing slowly gaseous hydrochloric acid into an ethereal or chloroform solution of it, were equally unsuccessful. The chloroform extract was at several stages dissolved in alcohol, and the solution tested with several indicators, but in no case could we obtain any indication of alkalinity. And yet the substance, tested with metallic potassium for nitrogen, gave a fairly good positive test for it.

From the results herein submitted, unsatisfactory as they may be, we are forced to conclude that the body giving the reactions for alkaloids, is present in *taraxacum* in minute quantities only. With every step of purification the amount recovered becomes less and less, and the reaction with the general reagents fainter and fainter. The absence of any sign of alkalinity towards a variety of indicators, the non-formation of salts, amorphous or crystalline, as well as the unusually small amount present in the plant, throw, in our opinion, grave doubts upon the alkaloidal nature of the substance under consideration. The fact that the general reagents for the alkaloids form precipitates with nitrogenous bodies other than alkaloids, seems to point, in this case, to an answer in the negative.

In conclusion, it must, however, be noticed that what has been said above applies only to the roots of *taraxacum* collected at the time of the year specified at the beginning of the paper.—*Chemical Laboratory, University of Michigan.*

There being no discussion, the two papers were ordered to take the usual course.

The following paper by George H. Bardrick and L. E. Sayre was read by title only and referred for publication:

AN EXAMINATION OF ALLEN'S PEPSIN TEST.

BY GEO. H. BARDRICK AND L. E. SAYRE.

One of the important questions for the next Committee of Revision to consider will be, doubtless, that relating to the United States Pharmacopœial test for pepsin. The present method is unnecessarily long and tedious, and from the chemist's point of view is inaccurate. The best that can be said of it is that it will give approximately the strength of the sample tested if it be carried out strictly according to the directions of the United States Pharmacopœia, but the operator should have had considerable experience with the process itself.

Allen's method of testing pepsins is based upon the analysis of the products of the digestion, and a pepsin is rated in value mainly according to the amount of peptone produced, although several other products of the digestion are taken into account.

The process is fully described in Allen's Commercial Organic Analysis, Vol. iv., 2d and 3d p., 256. The outline of the process is as follows:

About 1 Gm. of egg albumen in scales is powdered and treated in a 100 Cc. flask with 20 Cc. of warm water. When the albumen is dissolved, the liquid is heated in a bath of boiling water to coagulate the albumen, and cooled to a temperature not exceeding 40° C.; 0.100 Gm. of the sample of pepsin to be tested is next added, followed by 25 Cc. of $\frac{N}{10}$ hydrochloric acid (or a better way, perhaps, is to dissolve the pepsin in the acid). The temperature is then raised to 40° C., and kept at this for three hours. An equal volume of $\frac{N}{10}$ sodium carbonate is then added to exactly neutralize the acid, and the temperature raised to boiling. Enough water is now added to make the liquid measure 100 Cc., and it is then filtered. The precipitate consists of syntonin and any unaltered albumen. The filtrate contains albumose and peptones. The first 50 Cc. of the filtrate is now saturated in the cold with powdered zinc sulphate, for which about 60 Gm. are required. This precipitates the albumose. After half an hour's standing the precipitate is collected on a filter. The filtrate, diluted to 250 Cc., is then acidulated with hydrochloric acid and treated with an excess of bromine water to precipitate the peptone. The bromo-peptone is collected on an asbestos filter, washed with a saturated solution of zinc sulphate, introduced, with the asbestos, into a Kjeldahl flask with 20 Cc. of strong sulphuric acid, and the whole heated over a wire gauze. The organic matter chars, and bromine vapors are evolved. When frothing has ceased, about 10 Gm. of powdered potassium sulphate are added, and the liquid boiled vigorously until it is colorless. After cooling, it is diluted with water, an excess of soda added, the ammonia thus liberated is distilled off, and the distillate titrated with standard acid. From the nitrogen found (multiplied by 2), the amount of proteid (peptone) is deduced, employing as a factor 6.3.

Our experience with the process leads us to propose a few modifications which one of us has previously suggested:*

We are inclined to think, in the first place, that the scale albumen should be specially prepared. That of the market is not uniform in quality; it contains variable amounts of globulin, and is variable in solubility and digestibility. To prepare scale albumen, the white of egg may be dissolved in water, the solution filtered and evaporated in a partial vacuum, or at a very low temperature, in a current of dry air, to a syrupy condition, and spread on glass to dry in a current of warm air.

* See Druggists' Circular, Jan. 1899, p. 4.

In the second place, the pepsin, when added, should be dissolved in the $\frac{N}{10}$ hydrochloric acid, as suggested above, which acid should be heated previously to the temperature of 40° C.

In the third place, when the ammonia is distilled it should be conducted into an excess of decinormal acid, and the whole titrated back by standard alkali, to ascertain the amount of acid neutralized by the ammonia distilled over. To compute the amount of proteid from the ammonia found, the latter is multiplied by the factor for nitrogen (0.014): this product is then multiplied by the factor for proteid (6.3).

Finally, the laboratory experience with the process has prompted one of us (J. H. B.) to suggest that if in the distillation, potassa (KOH) instead of soda (NaOH) be used to liberate the ammonia, the great annoyance of bumping may be avoided. The potassa should, of course, be free from nitrogen compounds, but the best results are obtained when it contains some lime, iron or other like impurities.

In order to test the practicability of the Allen method as one for the average pharmacist, several trials of it were made last winter in the laboratory with students. The result of this work was published in the Druggist's Circular, January, 1899, p. 4. Since this time a number of experiments were performed by us to further estimate its value to the chemist. We are not prepared with our present experience to say that it furnishes any more accurate results than the United States Pharmacopœia method, but we can recommend it as a valuable confirmatory test.

In the present paper the authors desire to present some results obtained by the analysis of six samples of commercial pepsin as purchased in the open market; samples were taken from open bottles. In every case it seemed that the chances for deterioration had been very great.

Each of these was submitted first to the United States Pharmacopœia test; afterward to the Allen test, using 1 Gm. of scale albumen and 0.1 Gm. of the pepsin sample. The digestion, instead of being continued to a uniform definite time, was in each continued until all of the coagulated albumen had disappeared or was entirely dissolved. The length of time in accomplishing a perfect solution varied according to the proteolytic activity of the sample.

Each of the pepsin samples was examined for proteid by the Kjeldahl process, using Allen's modification of this with the following results:

Proteids found in Pepsins used.

1	71.26 per cent.
2	71.40 per cent.
3	68.50 per cent.
4	65.40 per cent.
5	42.84 per cent.
6	38.85 per cent.

The digestive power of the pepsins tested is shown by the subjoined table:

By Allen's Method.

No. of Sample.	Strength indicated by U. S. P. Method.	Syntonin.	Albumose.	Peptone.	Proteid in residue.	Time.
1.....	1 to 2482	5.19 p. c.	21.77 p. c.	32.98 p. c.	39.65 p. c.	1 hr, 15 min.
2.....	1 to 2250	6.4 p. c.	27.15 p. c.	30.62 p. c.	35.01 p. c.	1 hr., 30 min.
3.....	1 to 2110	6.76 p. c.	32.61 p. c.	30. p. c.	30.72 p. c.	1 hr., 45 min.
4.....	1 to 1440	12.09 p. c.	37.74 p. c.	16.85 p. c.	32.17 p. c.	2 hr., 15 min.
5.....	1 to 1896	9.76 p. c.	41.48 p. c.	22.68 p. c.	26.78 p. c.	2 hr., min.
6.....	1 to 1220	16.43 p. c.	48.78 p. c.	13.93 p. c.	20.06 p. c.	2 hr., 30 min.

Proteid present in Albumen = 90.38 per cent.

In column 6, marked "proteid in residue," there is recorded the nitrogen (calculated as proteid) found in the filtrate from the brom-peptone.

The table as a whole shows certain facts which we might well expect:

1st. The amount of peptone produced is inversely proportional to the time required to accomplish the entire solution of the coagulated albumen. In other words, the pepsin producing the largest yield of peptone consumed the least time in the process.

2d. The syntonin and albumose are found to be inversely proportional to the peptone produced. The weaker the pepsin the greater was the amount of these proteids formed. Two unaccountable discrepancies appear in the table in this particular, namely, in 4 and 5. It should be stated here that all of the work was done in duplicate.

3d. The amount of peptone produced in the digestion was directly proportional to the strength of the pepsin. The percentage of peptone formed seems to be in ratio with 40 per cent. for a pepsin 1 to 3000.

4th. The table of results shows that when the United States Pharmacopœia is employed in connection with the Allen method it gives a clearer statement as to the proteolytic power of a given sample of pepsin—the Allen method furnishing an excellent confirmatory test when utilized as a control method.

The Chair announced that the time for installation of officers had arrived, and Mr. Ramsperger was appointed a committee of one to escort the Chairman-elect to the chair.

Mr. Ramsperger performed this office, and Dr. Rusby said:

It gives me great pleasure, gentlemen, to present to you as your presiding officer for the ensuing year Prof. F. G. Ryan, of Philadelphia. He has just been honored with advancement by his own college, and it is a sort of professional birthday with him, and I take peculiar pleasure in introducing him as Chairman of this Section at this time. (Applause.)

Mr. Ryan said:

I suppose on occasions of this kind one is expected to make a speech, but I want to

tell you a little incident that occurred not long ago in my experience, and then possibly you will be willing to let me take the chair without a speech: It was my good fortune to preside recently as toastmaster at a banquet—a small affair—and we had present there a gentleman known to be a splendid after-dinner speaker and quite a wit. I thought I I would take advantage of the occasion to introduce him in a vein of humor. His name was Williams—Col. Williams. So I said all we had to do was to drop a dinner in the slot and up comes Col. Williams with a speech. Williams got up and said: "We all know the toastmaster, and all we have to do is to call upon him for a speech, and up comes your dinner!"

I am uot unmindful of the fact that, in accepting the chairmanship of this Section on Scientific Papers, I am succeeding men who have attained eminence in the profession of pharmacy and allied sciences, and I am also not unmindful of the fact that they have set a very high standard for the work of the Section. All that I can promise you is, that my best efforts shall be used toward the continuance of the work on the lines laid down I thank you, gentlemen, for the honor conferred upon me.

Mr. Ryan took the chair.

Mr. Mayo was introduced as the new Secretary of the Section, and acknowledged the honor conferred and thanked the members therefor.

The Chair announced that new business was in order, and that, under that head, he would say that Mr. Francis Hemm, of St. Louis, had been selected by Mr. Mayo and himself as the other member of the Committee on Scientific Papers.

MR. KRAEMER: I would like to move a vote of thanks to the retiring Chairman for the good work of the last year, and the way the work has been done at this meeting—for the large number of papers read and the general character of the work that has been accomplished. The office is a trying one, requiring a great amount of work, and I think we should recognize the able and unselfish labors Dr. Rusby has taken upon himself to make the work of the Section a success.

Dr. Reed seconded the motion, and it was carried unanimously.

DR. RUSBY: In accepting that vote, I really want to thank the members of this Section for the manner in which they have come to the rescue. I shrink from occupying the position of Chairman to such an extent that I assure you it is positively painful to me. But the manner in which those who have been asked to furnish papers have responded has been very gratifying to me.

I would like to say that I am sorry that, by oversight, the Secretary was not included in this vote of thanks, for he is a volunteer. It was largely due to his promptness that we accomplished what we did, and I should like to move a vote of thanks for him.

MR. HALLBERG; There has been a carefully laid-out plan governing the contributions this year, which I think has contributed very largely towards enabling us to get a far better grasp of certain facts of especially great importance at this time, and I think that certainly ought to be recognized.

The vote was put on the motion to thank Mr. Mayo for his efficient services as Secretary *pro tem.*, in the absence of Mr. Arny, and was carried unanimously.

DR. WHELPLEY: Mr. Chairman, our ex-Chairman very modestly gives his associates

credit for the interest attached to the work of the Scientific Section this year. It is scarcely necessary to remind you that, after the battle of Manila, Dewey did the same. (Applause.)

MR. MAYO: Dr. Rusby evidently thinks there is "sufficient honor for all." He laid out the work in such skillful manner, and so co-ordinated the subjects for consideration and discussion, and did his work generally so well, that the way was made easier and more instructive for all of us.

No other business coming up for the attention of the Section, and the reading of the minutes of this session being dispensed with, the Section, on motion of Dr. Reed, adjourned.

MINUTES

OF THE

SECTION ON EDUCATION AND LEGISLATION.

FIRST SESSION—FRIDAY MORNING, SEPTEMBER 8, 1899.

The Section was called to order at 10:45 a. m., by the Chairman, Dr. A. B. Lyons.

The Chair explained that a delay of several days in the mails had made it impossible for the official printer of the Association to get his report into print in time for the meeting of the Section, and that he had been unable to get it printed otherwise. He also expressed regret that no one had volunteered to prepare and have ready for this Section a draft of a model pharmacy law.

Dr. Lowe was invited to take the chair, while Dr. Lyons read his address as follows:

CHAIRMAN'S ADDRESS.

The first subject to engage the attention of this Section is the framing of a Model Pharmacy Law, to which it is hoped that the laws existing in the several States of our Union may in time be made to conform.

Nearly every State has now a pharmacy law. In no two are the provisions of the law identically the same. Under the diversity of conditions that must exist in different regions of our great country, absolute identity in detail in the legislation governing the practice of pharmacy is perhaps not even ideally to be sought, but the existing diversity has in fact no relation to differences in the local conditions. More largely the differences are due to idiosyncrasies in the different legislative bodies.

Be that as it may, all will agree that such measure of uniformity ought to exist and be insisted upon, that a member of our profession in good and regular standing in one State may not find himself or herself disqualified in another State from the practice of that profession. Such degree of uniformity should exist that incompetents excluded from the profession in one State shall find it impossible to secure the coveted privilege by migrating to a neighboring State.

When all is said, however, it is not so much uniformity of enactment in the different States that we need as it is a revision of defective laws in the light of the experience gained through the past and existing diversity in enactment. Lawmakers, perhaps not more in

America than elsewhere, promulgate statutes which fail in practice to secure the proposed ends. A pharmacy law seeks simply to protect the people against the danger from ignorance or incompetence on the part of those who dispense or sell drugs. The man who is willing to assume the responsibility of dealing in deadly agents, which constitute so important a part of the physician's armamentarium, must be qualified by a special course of training, just as the engineer of a passenger train must. In either case the State has the undoubted right to impose such conditions and restrictions as may be judged necessary to reduce to a minimum dangers from accident. The pharmacist must have a license to practice his profession, based upon such training and experience as shall fit him for the responsibility he assumes.

The primary object sought in a pharmacy law is therefore simple and clear; the difficulty has been to frame an enactment which should secure this object. The first question that arises is, where shall we find competent judges to pronounce on the qualifications of candidates? Assuming that there exists in the state an organized association of qualified pharmacists, it would seem natural and right that this body should have the selection of the required judges or examiners.

Of course, it should be further assumed that the State Association admits to membership *all* qualified pharmacists of the state: indeed, membership in such an Association should be required of every registered pharmacist, who should forfeit his registration if expelled from such Association.

Unfortunately, no such ideal condition of things exists. The state organizations have not always been of such representative character as to command the confidence of the people, who, furthermore, are ready to take alarm at any hint of class legislation. It has thus happened that the nomination and appointment of the examiners has, in some of the states, been placed directly in the hands of the Governor of the state, or of some other public official or officials, bringing such appointments dangerously within the sphere of party politics.

The questions also of personal qualifications of the examiners, and of compensation for their services, are of vital importance in their bearing on the efficiency and incorruptibility of the Board.

Now, in regard to all these and many other details, we are in possession of the results of practical experience in the working of a great variety of plans. It should not be difficult to select from these such as commend themselves, first, on theoretical considerations, and second, by their successful working.

We may ask the question, "have the possibilities with regard to the selection of the examiners been exhausted?" There is certainly one plan that remains which is worthy of a hearing. The object sought is to provide for each state a Board of Examiners that shall owe nothing to local or party politics. Now, have we not in the American Pharmaceutical Association a body sufficiently representative of our profession in all its interests, at the same time sufficiently removed from political influences of all kinds, to be charged with the responsibility of nominating, under proper restrictions, the Examining Boards for the several states? Suppose, further, that out of five members constituting such a board, three were to be nominated from members of this Association resident in the state for which they were to serve, and two to be nominated by the American Medical Association in a similar way from its membership. The nominations in each case to be made with alternative names, and the actual appointment of the Examiners to be made, perhaps, by the State Governor.

Opposition to such a plan would come from every corrupting influence at present existing, but also from those State Associations which take a just pride in the Pharmacy Boards that are now of their own choosing. I have thrown out the suggestion as that of an ideal possibly unattainable, hardly expecting that it will here and now meet with much favor. Yet, if uniformity in our Pharmacy Laws is so desirable as to be worth

some sacrifice, there may be herein the germ of something that may some day come to its evolution.

It is not for me, as Chairman of this Section, to enter into detail into any discussion of the several provisions of a Model Pharmacy Law. It is not beyond my province, however, to point out the particular feature which, next to that I have spoken of, seems to me of the greatest importance. This, it is hardly needful for me to say, is the educational requirements for registration.

The older pharmacists of this country, names held in honor among us to-day, were largely self-made. There were no schools in which it would have been possible to acquire an adequate professional education; for them there was no alternative but to pass grade by grade through the slow course of the University of Experience.

The conditions to-day are wholly different; that same old University is more chary than of yore of its diplomas. Educational methods have been so improved that a man can no longer afford to neglect the opportunities they offer if he is to enter the race with competitors of his own age. Moreover, the schools themselves to-day supply in their laboratories a superior kind of experience training—far superior, even at the poorest, to that of any possible apprenticeship in an average modern drug store. (The very mention of such a thing amuses you, and no wonder.)

Under these changed conditions, it seems to me right that new candidates for registration should bring as a *sine qua non* the diploma of a college of pharmacy, such college requiring certain definite specified courses of study and of laboratory training. I believe, too, that something more should be required than merely a technical education. The diploma offered should certify to an adequate preliminary education, such as should be expected in a professional man, or else the candidate must produce independent evidence that he has this qualification.

The question has been raised in this Association whether it is scientific or trade interests that should be paramount in our thought. I wish here emphatically to declare that it should be neither. The pharmacist, like the physician, is a professional man.

In connection with the subject of legislation governing the sale of poisonous drugs, your Chairman desires to call attention to a practice which he has reason to believe is a very common one, that ought to be contrary to law. I refer to the shipping of packages of crude drugs to customers without labels. The retail dealer is compelled by law to label distinctly every poisonous article he dispenses, and the necessity for the law is recognized by every one. Is it less important that a package of belladonna root that may form part of a shipment of a dozen crude drugs should be so distinctly labeled that it cannot by any possibility be mistaken for some harmless root?

Your Chairman suggests that inquiry be instituted by this body as to the prevalence of the practice among dealers of shipping crude drugs, poisonous or not poisonous, without labels, and if the evil be found to exist that a remedy be sought in appropriate legislative measures.

I pass now to the main topic of my formal address, namely:

PHARMACY AS A PROFESSION,

hoping that you will follow attentively and sympathetically the line of my argument. I am aware that what I have to say is of a very elementary character, but I believe it to be also fundamental to a true conception of the aims and objects to be sought by us individually as pharmacists and collectively as a Pharmaceutical Association. Our profession is our business, as is that of the physician. The drug stores we conduct bring into our business a commercial element which is wanting in that of the physician, but it is not from the ordinary profits of a commercial business that the pharmacist who has devoted unproductive years to preparation for his profession, hopes to win his living. He may cultivate the commercial part of his business at the expense of his professional character and

perhaps, individually, do a successful business; but if all his brother pharmacists do the same thing, the end is disaster in the attempt to compete with the unprofessional "cutter" and the department store.

Of course, the pharmacist may engage, if he chooses, in a strictly commercial business in side lines; but his drug business, which is a monopoly if you choose to so call it, must be conducted on an ethical basis of co-operation, not of competition. The registered pharmacist should be tacitly pledged to maintain a special professional scale of prices, not extortionate, but just to himself as well as to his customer. It is not necessary that there be an extended list of prices fixed by authority of government as in Europe, although that would simplify matters if it were not essentially "un-American;" but there should be some simplified but authoritative schedule that would enable the pharmacist to make a price that would be practically the same as that of his neighbor, and which in professional honor he is bound to abide by.

The necessity for some such procedure becomes greater every year, as the pharmacist comes more and more to deal in ready-made pills, tablets, etc. These he has been disposed heretofore to regard as ordinary merchandise, on which he should be content to make only a moderate per cent. of profit. Here he does himself and his profession an injustice; indeed, endangers the very existence of the profession.

Pharmacy as a profession, claiming and receiving in pharmacy laws state recognition, is in intimate and vital relation, as you all well understand, with the medical profession. If physicians did not habitually or occasionally prescribe as remedies poisonous substances, there would be little danger that poison would ever be swallowed, except through criminal or suicidal intent; at all events the laws required to secure the public against accident from this source would be simple, providing merely that certain specified articles should be sold only in packages of a prescribed kind. It would be quite needless to require on the part of the salesman any particular educational qualification. The very existence, then, of the pharmacist depends on his relation to the physician. I need not say to you that the ideal relationship is one thing, the actual, quite another. Yet, that is not more true in this than in a thousand other human relationships. Here, as elsewhere, however, adjustments must be based upon the ideal rather than upon the actual, if there is to be any stability in human institutions.

We are then as a profession ideally associated in an intimate and necessary relation with the medical profession. The ideal is a rational one. No better, as far as I can see, can be suggested. The alternative seems to be that we are merely tradesmen, handling a small and rather unimportant line of goods. Under our ideal we may justly claim such legal privileges and exemptions as are embodied in the most of our pharmacy laws. As mere tradesmen, we have no shadow of right to such privileges and exemptions. Is it not worth our while to strive to perpetuate the ideal? I believe that all who are here present will agree with me that it is most emphatically. Possibly a majority of the druggists of America, those not represented in this body, would dissent, consigning ideals to a very torrid place. These we must leave to work out their own salvation, if they can, on the lower plane they choose to occupy.

We believe that there is still a place in the world for the profession we represent. That it is not precisely the same place which it held a quarter of a century ago is axiomatically true. We live in an age of rapid transformations. Year by year, almost day by day, we must adjust ourselves to changed conditions, keeping, however, always clearly in view the ideas we seek to realize.

Now, if ideally we are still vitally connected with the medical profession, we neglect an obvious duty if we do not individually and, especially through our organizations, make ourselves necessary to the medical profession. Are we, still doing this? Are we, any of us, doing all we can in this direction? Does the American Pharmaceutical Association do its full duty as the representative body of our profession in this country, in en-

deavoring to establish with the American Medical Association relations of mutual helpfulness?

Some of the manufacturing pharmacists of the country, with nothing but individual pecuniary profit in view, have set an example of what might be done towards gaining the confidence and good-will of the medical profession, by undertaking scientific researches. The laboratories for carrying out chemical and physiological investigations of drugs, that should have been endorsed and maintained by our body, have been supplied by firms whose interests are those of a part only, not the whole of our profession. Through this kind of private enterprise, moreover, important scientific researches are conducted in the laboratories of our universities, the credit going of course to those who have "promoted" the researches.

Is it not time that this Association as an organized body place itself in the forefront of this species of enterprise? Suppose that we were able to report to the Section of Materia Medica and Therapeutics of the American Medical Association each year results of work of this kind, directed to the solution, without bias or prejudice, of problems that are engaging the attention of physicians themselves, would there not be established between these two representative bodies relations of mutual cordiality and confidence that do not exist to-day?

Impracticable, do you say? Well, suppose there was a committee of this body charged with ascertaining what particular problems in scientific therapeutics physicians are most anxious to have solved. Suppose the same committee, to secure the services in the various college laboratories of the country of investigators to report results of studies of these problems, giving to members of the Association who might be willing to volunteer their services opportunity to have a share in the work, might not results of exceeding great interest and value be obtained at very small expense, and our Association be exalted to the position which it ought to occupy?"

It is not necessary that we have a new committee appointed for the purpose. The work is such as falls legitimately within the scope of a Research Committee such as we now have. I am aware that the task of ascertaining what scientific problems in therapeutics are actually engaging the attention of physicians would not be an easy one—that there would be fonnd among physicians so general an indifference to the theoretical side of therapeutics, and withal such a sensitiveness about admitting any need for instruction from an auxiliary profession, that it would require repeated and persistent endeavor, as well as the exercise of much tact and patience, to establish any such relations of mutual confidence as must exist for the success of the plan. Yet is not the end to be attained one of such supreme importance as to justify expenditure of such patient and persistent effort?

State organizations also should take a share in the same kind of work, cultivating affiliations with local medical societies for mutual profit.

Precisely this kind of work, it will be said, perhaps, the members of this Association have been doing year by year, as the volumes of our Proceedings abundantly attest. True, and it is equally true that a considerable part of the energy directed to scientific work in the Association has been misdirected, in that it has been often merely scientific, when it should have been professional. Do not understand me to deprecate in any degree scientific work. There is value in every contribution we can make to human knowledge, and the fuller understanding which we reach by exhaustive scientific research, often produces radical changes in our views regarding practical relationships which we had supposed we fully comprehended. Still, he whose business it is to prospect for gold, must make gold, and not diamonds, definitely the first and main object of his search. So as pharmacists we owe it to our profession to direct our studies more simply and persistently to problems belonging to the domain of therapeutics.

Further, much of the work which we have done in the past on these very practical lines

has been lost because it has never reached the physicians, who go on year after year following traditions that *we* know are founded on error. We owe it to ourselves to see that the results of our scientific work are brought before the medical profession in such form that their practical bearing cannot fail to be manifest.

Here again we may take a cue from the manufacturing houses, observing how willing the physicians are to accept the information furnished through medical journals which are really organs of these houses. I have no quarrel with the house that has the enterprise to provide itself with such an organ. But a manufacturing house represents a business and not the pharmaceutical profession, and it is not in human nature that there should not be a bias in the information disseminated by such an organ in favor somehow of the business whence comes its inspiration.

Now, with a laboratory for physiological and chemical research work, conducted not in the interest of any individual, or firm, but purely for the good of our profession, we should need an organ, disconnected in the same way from all private bias. The right thing would be for both laboratory and journal to have an intimate relation with the Committee on Revision of the U. S. Pharmacopœia, the journal constituting thus an official Ephemeris of the Materia Medica.

Where, do you ask, will you find the talent to conduct such a laboratory and such a journal on the exacting condition of freedom from individual bias? I point you for an answer to the past record of self-sacrificing and self-forgetting work, done without compensation by members of this Association, men, some of them, who might have been supposed to have their private axes to grind. The men who belong to this Association have always realized that when they meet as members of the pharmaceutical profession it is professional and not individual interests that are paramount.

Shall we fear, then, that when we decide that the common interest demands organized effort that will mean generous outlay of money, there will be lacking men to serve their profession faithfully and well, under salary?

Ideally, pharmacy is a profession. How shall we make it in greater degree actually such? One plan that has been strongly advocated by many is to create a body of pharmacists distinct from that of mere druggists. Pharmacy laws are to recognize, indeed to create the distinction. One class shall be mere vendors of drugs, with limited privileges in regard to their sale; the other, with more exacting requirements as regards qualifications, shall be entitled to all the privileges and immunities now granted to the registered pharmacist. I cannot agree that such a distinction is likely to accomplish all it seeks. We all know that fewer prescriptions are written to-day than a few years ago, and that of the prescriptions written, a very greatly reduced number are for mixtures to be compounded extemporaneously. Even the competent and conscientious pharmacist finds it more advantageous to purchase than to make many of the preparations which a few years ago he would have been obliged to make himself. There will surely be small encouragement for a man to turn to this means of making a livelihood if there is to be keener competition in what has been heretofore an important part of the business, the competition coming from the new class of mere druggists, men naturally governed by purely mercenary considerations and so utterly unfit to form any alliance with professional men. Such a discrimination made years ago might have led to the evolution of a professional body more closely allied with that of the physician, but the golden opportunity, in my judgment, is past.

If pharmacy is a profession, if must have an ethics of its own. Its code must require that when private pecuniary interests conflict with the higher good of the profession, the former must be sacrificed.

Pharmacists and physicians, acting in unison, decide what agents shall be accepted as constituting a materia medica, so that it may be possible for a patient, through co-operation of physician and pharmacist, to get the benefit of scientific medical treatment.

There can be no arcana in medicine. Such things belong only to quackery. They are essentially extra-professional.

This does not mean that there can be no remedial agent of value outside of the list now known to physicians. Every month puts us in possession of some new-found remedy of value. It means simply that those who are associated in the professions seeking to provide for the healing of the sick, hold themselves under obligation to reserve for private profit no therapeutic secrets, so long as they hope to hold a place in their profession.

It is rightly maintained that the objects sought by the physician are of such transcendent importance that he has no right to keep to himself as a secret any discovery he may make. Whatever may relieve human suffering or prolong human life, the physician claims to be the common property of his profession, and every one admits the justice of the claim. Who knows which one of us may be in need to-morrow or to-day of the remedy which individual interests would lock up as a secret for the enrichment of the fortunate discoverer thereof?

The physician's code condemns, then, utterly and unconditionally, secrecy as between members of the profession. Must not a similar principle of ethics be recognized in pharmacy? The pharmacist is expected to supply for patients the remedy the physician prescribes. Prescriptions are written on the assumption that the remedies ordered are such as the pharmacist can supply. It is evident that any collusion which makes a prescription intelligible only to a particular pharmacist, is unprofessional. Equally evident is it that the pharmacist who asks an individual physician to prescribe, for his benefit, a medicinal compound whose composition is his secret, is guilty of unprofessional conduct. What, then, of the man who asks medical men throughout the country to prescribe a product of his laboratory, to which he gives some high-sounding hog-Greek name, and of whose composition and therapeutic action he gives an account that might have been copied from a patent medicine almanac?

Such things are done in America with the most brazen effrontery. It is simply pharmaceutical quackery. I open the last number of the Journal of the American Medical Association (August 5, 1899,) and find such announcements as these:

"Our products contain alum rendered perfectly non-irritating *by our exclusive process.*" The products are "ethical," however, for they are advertised to the profession as *non-secret.*

This comes from a "Pharmacal" Company, but the remedies advertised are offered to physicians for use in the treatment of specific diseases with the vague statement simply that "These four treatments are successful in their respective diseases. They would not be used as extensively as they now are by distinguished members of the profession or openly endorsed so voluntarily, if they were not successful."

On another page we find displayed in orthodox patent medicine style:

CHIOLIN

(TRADE-MARK.)

A NEW EXTERNAL APPLICATION

FOR THE TREATMENT OF

Pruritus Ani, Pruritus Vulvæ, Acne, Hemorrhoids, Eczema, Chancroids, Chilblains, Salt Rheum, Erysipelas, Erythema, Burns, Chronic Ulcers, Chronic and Scrotal Eczema, Felons, Carbuncles, Itching Piles.

A PROMPT RELIEF IN

Rheumatism, Sciatica, Neuralgia.

IT IS ANTISEPTIC, ANTIPRURITIC, ANTIPHLOGISTIC.

CHIOLIN is a perfectly harmless application even to a most sensitive membrane. As an application in Chronic Rheumatism it will be found eminently efficacious, and relief will be prompt. Literature on application.

AN EFFICIENT REMEDY FOR ALL DISEASES OR ABRASIONS OF THE SKIN.

This is put out, it seems, by a "Chemical" Company.

Again, under the alliterative head, "Convincing and Convenient," we read: "The unvarying and unquestioned success achieved by the use of I's Antiseptic Powder in the treatment of leucorrhœa and gonorrhœa is due to its logical construction. The speedy recovery succeeding the employment of the powder exemplifies the wisdom of using a rational agent to accomplish a definite purpose, rather than experiment with mendaciously exploited cure-alls." Such gall approaches the sublime, which proverbially is perilously near the ridiculous.

Another in this galaxy of advertisers, under the facetious heading, "More Boiling Coffee," quotes thus: "Girl seven years old pulled pot of boiling coffee off table, scalding her breast and arms. Great pain. I applied carron oil for several days without any good results,"—not strange that—"so I tried *Vitogen* (sample bottle free)"—good logic. "After third application the wound began to heal immmediately, etc."

As to this vitogen we are told that "it is the ideal antiseptic disinfectant and germicide for burns, scalds, wounds, ulcerations and all external inflammation, superior to iodoform, less expensive, goes further. It is clean, convenient, inexpensive, successful" —never mind what it is made of, that is the secret of the manufacturers.

These are a few only of the secret nostrums which physicians are solicited through the advertising columns of their own especial organ to adopt as standard remedies and to prescribe for their patients. With regard to some of them, it is stated that they are not advertised to the laity, and this seems to be regarded as the utmost that any code of ethics can demand.

It is simply amazing to me that advertisements so grossly insulting as these are to the

medical profession can appear without calling out indignant protest. When I expressed this to a physician, he simply said: "Oh, it's the way the journals live. Nobody pays any attention to such advertisements." What fools the advertisers must be then!

Is there no remedy? Surely not if gold is really omnipotent. In face of this audience, and calling to mind the leadership in our sister profession, I refuse to endorse any such doctrine. Gold has been always powerful to seduce men into unworthy courses of living, but in the long run virtue is more potent than gold, and this rampant quackery here in the enlightened nineteenth century is sure to be the precursor of a revival of professional virtue. And to us, pharmacists and physicians both, virtue consists in clear recognition, first, of our professional responsibilities, next, in readjusting of our professional relationships in the light of this recognition.

A large part of the present evil has sprung indirectly from the fact of the marvelous development within recent years of the science of Chemistry. In former times drugs were derived chiefly from plants, which were used without any knowledge of their active chemical constituents. The chemist revealed the secret of the activity of many of these drugs, extracting therefrom their alkaloids and other potent principles. Meanwhile he was discovering and inventing a multitude of new organic compounds. Some of these were found to have important physiological effects on the human system. Scientific study of such effects has been pursued vigorously, with the result that our Materia Medica has been not simply enriched but rather quite revolutionized.

While Science reaped thus its well-earned harvest, Ignorance looked on with envious eyes—not long idly. New remedies are easy to manufacture, and just now, while physicians are bewildered with the multitude of newly-discovered remedies which come to them from the unexplored domain of chemical science, it will be possible to work in a few arcana from other unexplored fields. The busy practitioner, it is known, has little time for scientific reading. He is interested most of all in practical results, and a remedy that is effective will commend itself to him equally whether it is really a new discovery, or whether it is merely a combination under a fanciful name of remedies already well known. So reasons the pharmaceutical charlatan, who forthwith appears in the role of a benefactor of humanity, "giving to the profession" a new remedial agent, and putting into his pocket the people's shekels as his perquisite.

So much for a confessedly partial diagnosis of the evil. What is the remedy? That is what we have come here to discuss. It may be that there is practically no cure. The malady is a chronic one, which is bound to recur in some form of manifestation as long as human knowledge is imperfect, and human selfishness is dominant in the world. Palliatives consist in the removal of specific conditions of ignorance. The final cure can be accomplished only by the complete triumph of the professional over the commercial spirit.

A direct remedy for immediate use lies in the carrying out of the scheme to establish a laboratory and an organ for this representative body of pharmacists, and then use both fearlessly and faithfully to combat charlatanry with science. These must constitute a much-needed tribunal, before which must be brought all claims for recognition of new remedies. The existing medical press, and perhaps equally the pharmaceutical, is silenced by the paramount interests of its advertising columns. This new tribunal must, of course, maintain an essentially judicial spirit. It has simply to examine the claims of each new remedy, point out discrepancies, if they exist, between claim and fact, ascertain, perhaps, the real sentiment of influential physicians where this is matter of doubt. Discrimination must be made between the remedies which consist of definite chemical compounds which may be legitimately products of a chemical laboratory, and pharmaceutical products, such as elixirs, cordials, pills, suppositories, ointments, etc. The former, if they have really medicinal virtue, even if made by processes protected by patent laws, have a right to a place in the Materia Medica.

The latter can only be admitted on condition of the publication on every package sold of the true formula. Moreover, only such *names* as are in harmony with pharmacopœial usage can be tolerated. The principle to be established is that *there can be no exclusive privilege granted to a pharmacist to prepare anything that belongs to the list of legitimate pharmaceutical preparations.*

We should assail with persistent energy of attack the fantastic nomenclature affected by this new charlatanry, and individually and through our various organizations, unite in a crusade against this intolerable evil, which is establishing itself among us in high places. We must further use every effort to bring about a revival of the study in medical schools of the Materia Medica and of scientific therapeutics. We must court opportunities to do some missionary work in promoting these studies among physicians. More important than all else, we must see to it that our own professional ideals are above criticism, and then bear in mind the words of wisdom spoken in the chairman's address last year—seeking not to revolutionize the world we live in, but rather to direct the benign forces operating in the evolution of those institutions therein whose stability and permanence we desire to maintain.

I hope that this Section will not adjourn without an illuminating discussion of this most important subject, which shall bear fruit in some form of action looking towards the establishment on a firmer basis of the principles of our professional ethics.

Dr. Eccles moved that the Chairman's Address be placed in the hands of a committee of three, to report on the various recommendations at a later session, and that the committee take into consideration the advisability of taking that part of the address which refers to quackery and requesting the Journal of the American Medical Association to publish it entire. The motion was seconded by Dr. Bartley, put and carried.

On motion of Dr. Bartley, seconded by Mr. Hynson, the committee just authorized was ordered to report at the afternoon session at 3 o'clock, and the discussion of this report and the report of the Committee on National Legislation was made a special order for that time.

The Chair announced that the Committee on Chairman's Address would be composed of Messrs. Eccles, Stevens and Reed.

The Secretary of the Section, Dr. Lowe, read his report as follows:

SECRETARY'S REPORT.

To the Section on Education and Legislation of the American Pharmaceutical Association:

Gentlemen: Your Secretary would report for the Association Year of 1898–1899, as follows:

The year has been prolific of either attempted or accomplished legislation, such efforts being made in some thirty of the states. The following is a summary of such legislation as far as attainable:

Arkansas. The old poison law, which had become practically a dead letter, was repealed; it, however, was no part of the pharmacy law. Law passed prohibiting sale of cocaine, excepting for physicians' use or on prescriptions.

California. An amendment to the existing pharmacy law was passed by the legislature, but was not approved by the governor. This is to be regretted, as it would have been virtually a new and excellent law.

Colorado. Bill introduced into legislature, providing that new members of the pharmacy board are to be selected by the governor from a list of ten names submitted by the Colorado Pharmaceutical Association. Bill failed.

Delaware. Revised poison law passed legislature, but was not approved by the governor.

District of Columbia. Bill introduced into Congress "to regulate the sale of poisons," the chief points of which were (1) to require certain poisons to be sold in three-sided containers; (2) to prohibit renewing recipes containing certain poisons, if the recipe had written, or printed upon it, "not to be repeated"; (3) Discrimination against physicians outside of the district. Bill opposed by the druggists, and killed in committee.

Georgia. Law passed (not at the suggestion of the pharmacists) requiring them to pay a professional tax of $10.00 like physicians, lawyers and dentists. This leaves no doubt about pharmacy being regarded as a profession in Georgia.

Idaho. Pharmacy law failed to pass.

Illinois. Five bills introduced in the Legislature. All failed.

Indiana is to be congratulated on at last passing quite a fair pharmacy bill, which became a law without the governor's signature, and went into effect July 1, 1899. Re-registration must be made every two years at an expense for pharmacists of $1; for assistant pharmacists, 50 cents. The secretary may receive $1,500 a year, and necessary traveling and other expenses. As all salaries and expenses must be paid out of the fund arising from fees, it is likely he will receive much less.

Kansas. A bill was passed registering without examination eighty-nine "would be" pharmacists. Vetoed by the governor.

Louisana. The legality of the pharmacy law passed by the preceding Legislature has not yet been decided by the Supreme Court. It is claimed that the governor's veto came too late to be effective. The principal feature of the bill is that it requires those coming up before the Pharmacy Board for examination to be graduates in pharmacy.

Maine. A new pharmacy law passed, almost precisely as introduced into the Legislature. The Board is empowered to hear all complaints charging violations of the law, administer oaths, and compel the attendance of witnesses, etc. If convicted by the full Board, they may suspend or revoke the registration of the offender, but in case of an offense punishable by law, action shall not take place until after conviction by a competent court of jurisdiction. The fee for examination is $10. Two kinds of certificates are issued, viz., "skilled pharmacists," and "qualified assistants." The provisions of the law are extended to women.

Massachusetts. There has been much excitement in the state regarding appointments to the Pharmacy Board. The pharmacy law, as amended, provides for appointment to the Board for the term of five years, but no member can serve for more than five years *consecutively;* he must also be *actively* engaged in the drug business.

Michigan. Bill introduced to tax pharmacists $500; also another intended to include additional articles, such as laudanum, aconite, etc., not to be sold in general stores Both failed to pass.

Minnesota. Amendment passed to law, requiring all to be examined (registration on diploma no longer allowed). The Board, however, has the power, at its discretion, to grant registration to licensees of other states. New penalties have been passed for violation of the law. The certificate of any one who may become addicted to the liquor or drug habit, so as to render him unfit to practice, may be revoked.

Missouri. An attempt, which failed, was made to pass an amendment to the pharmacy law by adding new sections which required annual registration, exposure of certificate, lists to be furnished to county clerks, and defining duties of the Board.

North Carolina. The Pharmacy Board has decided to no longer recognize diplomas, "on account of the large number of new colleges springing up all over the country, thereby avoiding offence to any."

New Jersey. Attempt made to have all persons registered who had been in business three years. Failed.

New Hampshire. "A bill similar to the Massachusetts law was introduced, but was killed in committee."

New Mexico. Passage of a poison law, defining the poisonous drugs and prohibiting the keeping of an opium joint.

New York. The pharmacists of this state have been greatly stirred up by attempted legislation. Among the bills which failed were the "Costello Bill," to make all villages in the state "rural districts," as far as the selling of drugs in them was concerned. The "Shorter Hours Bill," which was passed by the Legislature and signed by the Mayor of New York, but was vetoed by the Governor. The "All State Law," which was intended to unify the present three Boards of Pharmacy, and have one law for the entire state; withdrawn with the understanding that a more satisfactory bill was to be introduced in the near future. The "Mazet Pharmacy Bill" for "Greater New York," and the "Poison Bottle Bill" also failed.

The "Pure Fruit Juice Bill" (as far as we are aware) is the only one that successfully ran the legislative gauntlet.

Oklahoma. An amendment to the law passed, registering graduates of the Pharmaceutical Department Oklahoma University.

Oregon. Bill introduced for compulsory registration of graduates of schools of pharmacy. Withdrawn without passing either house.

Pennsylvania. Bill introduced into the legislature to confine the sale of opium, its alkaloids and preparations; and of cocaine, to the prescriptions of physicians. Defeated largely through the efforts of the Pennsylvania Pharmaceutical Association. Law enacted making it unlawful to gather and sell second-hand bottles, jars, etc. Does not apply to refilling recipes by pharmacists or physicians. To be enforced by Boards of Health.

Rhode Island. Bill amending the pharmacy law introduced. It gives the President of the Board power to summon witnesses. Also gives the legal representatives of deceased registered pharmacists the right to continue business. Also relieves the Secretary from personal recognizance and surety for costs in cases where the Board is complainant. Disposition of bill unknown.

Tennessee. Amendment enacted exempting from the provisions of the pharmacy law those who had practiced pharmacy for a period of five years prior to the passage of the law.

Texas. The State has at present a very imperfect law, which regulates the practice of pharmacy by district boards, appointed by district judges. The Secretary of the State Pharmaceutical Association writes: "A strong effort, with a good law, but the 'whiff' of a 'trust' killed our laudable undertaking."

Washington. A new pharmacy law has been passed, two of its special features being the duty of registered pharmacists who take into their employ an apprentice for the purpose of becoming a pharmacist, to report to the Board within three months thereafter, such facts regarding his schooling and preliminary qualifications, as the Board may require for registration. Another requires itinerant vendors of medicines to obtain a license from the Board, the price of which is to be from one to twenty-five dollars per month.

Wisconsin. Amendment passed to pharmacy law. It states what domestic remedies can be sold by general dealers; also what poisons can be sold by general dealers in *sealed packages only*, such packages to be put up by a registered pharmacist of Wisconsin; also requiring poison sales to be registered by dealers.

STATISTICS OF THE PHARMACISTS OF THE UNITED STATES.

STATE.	Total on rolls.		Registered last year. By exam.		Registration without examination.					
	Registered Pharmacists.	Assistant Pharmacists.	Registered Pharmacists.	Assistant Pharmacists.	Ph. G.'s.....	M. D.'s	Other causes.	A. P.'s.....	Ph. G.'s or P. D.'s on Rolls.	Women on Rolls.
Alabama	881	....	34	....	1	2	1	....	.....	5
Arkansas.	1001	....	....	....	13	....	....	....	.....	2
California	1027	320	42	23	45	....	6	4	198	
Colorado.	640	37	49	19	....	....	....	....	130	6
Connecticut	396	288	28	.. .	24	....	....	....	.....	6
Delaware.	181	39	15	6	15	5	....	....	59	3
District of Columbia	772	....	10	....	26	....	....	....	.....	3
Florida										
Georgia	1106	....	64	....	....	20	7	....	130	3
Illinois	4548	1256	114	145	....	....	36	22	261	114
Indiana	3812	350	8	3	....	....	3804	347		
Iowa	2985	10	93	9	95	....	....	....	300	60
Kansas.	1517	90	27	3	24	....	....	2	68	27
Kentucky	1768	....	125	....	....	....	900			
Louisiana	1032	268	26	10	....	....	7	....	.....	15
Maine	543	32	35	3	....	....	....	....	.....	9
Maryland	310	....	17	....	....	....	293			
Massachusetts	3771	....	144	....	....	....	....	....	.....	61
Michigan	3099	324	67	....	....	....	1	66		
Minnesota	1241	166	40	61	7	13	7	....	150	38
Mississippi	945	....	21	....	....	....	....	....	.....	6
Missouri	3500?	....	101	....	....	....	....	....	800?	9
Nebraska	1448	....	36	....	....	....	....	....	.....	12
New Hampshire	621	69	17	14	....	....	17	14	.....	1
New Jersey	1671	49	93	10	....	....	....	....	.....	3
New Mexico	88	13	4	....	....	....	12			
New York State	5668	261	96	10	....	....	108			
New York City	4405	....	320	....	3664	421	....	....	.....	60
New York—Erie Co. (1898).	245	61								
North Carolina	282	212	24	....	8	12	....	....	48	3
North Dakota	268	87	24	....	13	....	....	37	.....	1
Ohio	3314	652	147	73	....	....	5			
Oklahoma	152	4	34	1	....	....	....	....	.....	2
Oregon	529	45	23	11	....	....	1	....	.....	12
Pennsylvania	5200	1500	246	232	....	....	....	....	2500?	50
Rhode Island	232	183	3	28	....	...	2	....	....	4
South Carolina (1898)	250	....	6	....	13	2				
South Dakota	485	12	22	9	....	....	....	....	36	8
Tennessee	1158	137	36	7	....	....	....	....	.....	4
Texas (estimated)	1470?	....	....	....	....	....	....	...	.....	20
Utah (1898)	229	36								
Vermont	433	10	14	2	....	1	....	....	10	14
Virginia	809	46	....	10	18	....	....	....	.....	3
Washington	501	45	33	8	....	....	....	....	.....	4
West Virginia	1168	64	....	....	6	....	....	....	72	3
Wisconsin	1349	337	67	70	....	....	8	....	600	35
Wyoming										

On analyzing the statistics thus tabulated we find the

NUMBER OF REGISTERED PHARMACISTS IN THE UNITED STATES.

From Board reports	66,950
Estimated additional (Idaho, Wyoming, Montana and Florida)	1,281
Total	68,231
An increase over last year of	2,945

NUMBER OF REGISTERED ASSISTANT PHARMACISTS IN THE UNITED STATES.

From Board reports	6,743
Estimated additional	385
Total	7,128
A decrease from number reported last year of	1,595

NUMBER OF PHARMACISTS REGISTERED LAST YEAR IN THE UNITED STATES.

From Board reports	2,302
Estimated additional	250
Total	2,552
A decrease from number registered last year of	171

NUMBER OF ASSISTANT PHARMACISTS REGISTERED LAST YEAR IN THE UNITED STATES.

From Board reports	767

Commenting on these statistics, we find that there would have been a decrease in the registered pharmacists of 5018 if those registered under the new laws of Kentucky and Indiana had been omitted. This decrease is accounted for by the revision of the lists in several states, notably California, Missouri, New Jersey and Pennsylvania.

In many of the states there is no class of "Assistant Pharmacists," these being included under the one head of "Registered Pharmacists," consequently the number reported is disproportionally small. The decrease of 1,595 reported is accounted for by the fact that in some states by the operation of the new pharmacy laws they became entitled to the grade of registered pharmacist.

These statistics, which should be of considerable value to the profession, were gathered with much labor, in some cases five letters being written to a secretary before they could be obtained; and in a few cases, notably that of Erie Co., N. Y., it was impossible to obtain them. Some, on the other hand, were wonderfully prompt, notably the secretaries of the pharmacy boards of Oklahoma and Washington. To all such the Secretary would hereby return his thanks.

CLEMENT B. LOWE, *Secretary.*

On motion of Mr. Hallberg, the report was received and referred for publication.

MR. STEVENS: I desire to introduce a motion that Prof. Beal, who has spent so much time on the subject of pharmaceutical legislation, be instructed to present to this Association at the next meeting the draft of a model pharmacy law. The importance of this is obvious, when we see the reports coming in from the different States. Some of the States rather expect a model law to be presented by this Association, and their action in some places has been put off on that account.

Dr. Stewart seconded the motion, but at the suggestion of Mr. Hallberg consideration of the motion was deferred until the afternoon session, to be

then considered in connection with the report of the Committee on Chairman's Address and that of the Committee on National Legislation.

MR. HYNSON: The report of the Secretary would seem to imply that about 68,000 were all the pharmacists represented in this country. But I very well know that the registered pharmacists do not represent anything like the entire number engaged in the retail drug business, and I expect Mr. Jones' figures are very nearly right. In Baltimore one man will be registered in a store, say, out of two or three, and sometimes more, employed there. This as to the larger stores, of course. I believe we have at least 33 per cent. more pharmacists there than the registration shows.

On motion of Dr. Bartley, duly seconded, it was ordered that the statistics gathered by the Secretary of this Section regarding the pharmacists of the United States be sent to the secretaries of the different State Pharmacy Boards, if approved by the Council.

MR. MAIN: In regard to the report from New York State referred to by the Secretary, it might be a matter of interest to this Section to know that a bill was introduced there to the effect that any medicinal compound that contained any poisonous substance must be dispensed in a certain specified bottle. This bill passed both houses of the Legislature and got into the Governor's hands, and would have become a law, notwithstanding the opposition of the pharmacists of the State, if it had not been discovered on the very morning it went to the Governor for his approval that the bottle was a patented one, and patented in the name of a well-known politician of the State. It was estimated by parties afterwards that there would have been a royalty of over two millions of dollars a year to the parties concerned. All poisons would have had to go into this special bottle. To show the influence behind this bill, I would state that, upon the Governor being made acquainted with the facts, the parties introducing it had sufficient influence to get a resolution through both houses of the Legislature authorizing them to withdraw the bill from the Governor's hands, thus saving it from veto. I state this as a matter of information, and with the idea that lobbies in other states might seek to thus impose upon the pharmacists. We got hold of a copy of a pharmaceutical paper showing the bottle and giving the name of the patentee the very day the bill came up to be acted upon.

MR. MAYO: I would state that as soon as this was pointed out to the Governor—who, as you all know, is the celebrated "Rough Rider" Roosevelt—he very promptly indicated his intention to jump on the bill, and they only stopped him by withdrawing the bill.

Mr. Voss, on behalf of Mr. Oldberg, offered the following resolution:

Resolved, That it is the sense of the Section on Education and Legislation of the American Pharmaceutical Association that no person should hereafter be registered as a pharmacist, or licensed to practice pharmacy, who has not received a systematic, special education in a school or college of pharmrcy approved by the Licensing Board.

At the suggestion of Mr. Voss, the resolution was referred to the Committee on Chairman's Address, that the matter might come up for discussion at the afternoon session, in connection with the Committee's report.

Mr. Sheppard offered the following resolution:

Resolved, That the American Pharmaceutical Association, represented by its Section on Education and Legislation, hereby expresses its approval of the proposition that none

but recognized graduates should be received by Boards of Pharmacy as candidates for examination.

Also, that while such action is not practicable, at the present time, it should be steadily advanced by all reasonable discussion and agitation.

On motion of Dr. Bartley, this resolution was referred also to the Committee on Chairman's Address.

On motion of Mr. Mayo, Mr. Whitney was requested to read at this time his paper on the Framing of a Model Pharmacy Law, and he did so as follows:

THE FRAMING OF A MODEL PHARMACY LAW.

BY HENRY M. WHITNEY.

In response to the circular letter from the Chairman of the Section on Education and Legislation, regarding "the framing of a model pharmacy law," a few plain facts may be of service, even though they may not be accepted by members who would abandon the popular public service of the old time drug store, and go into parlors where only scientists may enter.

As all laws are supposed to be made for the best interests of the people, it is assumed that a pharmacy law is for the protection of the people.

1st. To secure reliable drugs, true to name; care, skill and accuracy in compounding and dispensing.

2nd. To prevent those not qualified and certified by state authority from claiming the right to compound, sell or dispense drugs, medicines, chemicals and poisons, to the probable injury of the people.

The sale of intoxicating liquors for medicinal use, like some of the poisons, is also restricted by law, and their use in compounding and dispensing is a necessity in the drug store; we have then, for the pharmacy law to secure and approve,

1st. Competent persons, qualified to assume the responsibility of conducting a drug store.

2nd. Sufficient wisdom and knowledge to prevent the sale of poisons for improper use.

3rd. Judgment and discretion in the sale of intoxicating liquors for medicinal use.

4th. A clear, comprehensive appreciation of the law, as required by statute, and positive compliance with it.

A perfect law without enforcement, or left to the usual methods of enforcing laws, would soon become a snare to many, and a delusion to others. An occasional violent, impulsive or passive action would not produce results of any value. There must be constant vigilance, enthusiasm, fearless, faithful and persistent work, and upon lines of absolute justice to all alike. And such work can best be done by those who have no political fences to keep in repair, no organizations to please, no purpose other than

a faithful service to the people they serve, and a keen appreciation of obligations, equaled only by an executive or judicial position. "Any man who holds a position of power among his fellows, and neglects or evades the duties of that position, disgraces it. It is as dishonest as any action for which many persons are sent to prison."

A *board* of pharmacy is as important as the *pharmacy law*, and should be composed exclusively of pharmacists of long practical experience, familiar with all the conditions, and appreciating, as no one else can, all the requirements and demands attending the practice of pharmacy. In a republic like the United States, any person conducting a legitimate business cannot be legislated out of it, and the results of any pharmacy law, or the work of any board cannot be known and fully appreciated until such time as all pharmacists have become such under the certificate of registration by *examination*.

It is a special or civil service regulation, for and in the interests and protection of the people; and as seems to be the approved method, is confined to a special board or commission, appointed by the executive, and approved by his advisers, with powers of removal for cause.

A pharmacy law, while primarily for the people, brings with it the same protection afforded to pilots, engineers, attorneys, physicians, etc., and a license or certificate under the seal of the State, issued by the board for such protection should be at the expense of the applicant for such license or certificate. With the varying standards of the several colleges of pharmacy, the necessity of a wise selection of examiners is apparent.

If the securing of competent persons, entitled to the certificate of registration, was the full duty of the board, the selection of the board and its work would be comparatively easy. While pharmacists as a body are rated as good men and true, they are human, and in every calling are found those who for gain, selfish, personal interests, violators of law, force a control upon the entire class. This control as exercised by special boards or commissions is the vital point upon which hinges the progressive, elevating and future condition of pharmacy. Many of the States have placed upon their Boards of Health, Boards of Pharmacy, tax commissioners, etc., judicial or prosecuting powers.

Will pharmacists of these United States submit to this control? And will the people, through their legislative bodies, demand and provide ways and means for such control? If not, the pharmacy laws are a farce, and simply delay the final extinction of a calling or public service, recognized in every age as a refuge in emergencies, bureaus of information and assistance, relief and comfort, provided in no other way. Pure and undefiled advanced pharmacy for the exceptional "four hundred" may exist for the employment of one to a million; and will these few scientists who cry out so loudly for reform, ignore the wants and needs of the masses who have required, and always will require, salts, senna, picra, and a long

list of simple remedies? Is it common honesty, or even fair treatment of the people, for this Association to neglect the effort to elevate and improve the service of the present drug store? If this Association should depend for its existence upon the scientific part alone, where would it land in five years? One influential speaker at the Baltimore meeting talked loud and long about the eliminating of the commercial side of our business, saying, "The mercantile side is going," and gave as an illustration one store in that city and several in Chicago. Chicago inaugurated the purely commercial association as a necessity, and took the proprietor of the Baltimore store for its president. The speaker's illustrations were good, but his conclusions were weak.

In all kindness, it is suggested that "thoughtful men," if honest, would eliminate the "worthless institutions which grant undeserved diplomas," from the list of reputable colleges of pharmacy before claiming that the "shadow" of the one store will cover and kill all the other Baltimore drug stores. Three such "professional (scientific)" stores as the one named could not live a year even in the city of monumental fame.

Let us be honest with ourselves and those we are trying to serve. It is not the exceptional professional pharmacist of a purely "scientific character" and the few clients such a scientist would welcome and serve that we want legislation for; but it is for the millions of people, and the thirty thousand pharmacists who have a right to expect and demand from this body such protection from ignorance and reckless dispensing of drugs and intoxicants, and such helpful, elevating, intelligent service as we can render to both upon the broad lines of humanity. We may as well discuss and plan the future of the Philippines, and as easily, as we can determine the future of pharmacy. What we require at present is wise, helpful assistance to meet *existing* conditions. As Prof. Beal has said, "The fact that we have not better pharmacy laws in the United States is chargeable more to the indolence and apathy of the pharmaceutical body, than to the contumacy of the law-making bodies." That this is strictly true, the past year's record conclusively proves.

As one writer puts it, "The grievance of the 20 per cent., which they cry aloud from the house tops, makes more noise than the 80 per cent. The 80 per cent. apathy in allowing the 20 per cent. to subject them to minority rule based on purely minority factional interests, and those interests the saloon interests, carries with it all the elements of the senior class in pessimism."

If the pharmacists of to-day want a "model pharmacy law," it can be had for the asking by a united affort and active aggressive work. It cannot be had simply to build up colleges of pharmacy, or protect a favored few.

As previously indicated, a "model pharmacy law" should be in the interests of the people as much as the pharmacist, and all laws affecting

the conduct of the pharmacy should be in the hands of the Board, to control with full powers. Practically, a board of pharmacy should be like the judge and jury in the trial or hearing of any civil case; and if members of such boards were appointed for life, subject to removal for cause by the appointing power, there would be no politics, no favoritism, no juggling, comparatively no friction; and best results of a "model pharmacy law" would be secured. From death, resignation and natural causes, there would be as many and frequent changes as the best interests of such boards would require. It is not possible for the average board to get up enthusiasm, interest, persistent and independent action that will bring best results, if they are likely to be removed at the expiration of a short term appointment.

The most important factor in the successful results of a board of pharmacy is an even, continuous, growing, fearless, united and fixed purpose; changes from whatever cause, and particularly if of a varying political or factional character, will surely bring more or less friction. It is not in any way claimed that all or possibly any board as originally constituted is the best that can be selected; but when good men are secured, their experience and useful service should be continued, as the judge, the teacher, minister, pilot, engineer, physician or attorney. Boards of pharmacy have been criticised, and they always will be, as are all State officials, but if good work is accomplished, aid and encourage them by all the means in your power. It were better that no pharmacy law be enacted than that it should be controlled by the few who would degrade your calling to the saloon, or in some cases, even worse. This Association is the Congress of the pharmacists of this country. Our constitution very clearly sets forth the object and purpose of its organization.

Article I reads: "Its aim shall be to unite the educated and reputable *pharmacists* and *druggists* of America." Are we doing it? At the Baltimore meeting, the "cabinet" or leaders inclined to carry the administration to the "scientific" side, but were rebuked by the house, and one day session for the *Commercial Section* was demanded and secured.

If the "mercantile side" is going or gone, and this Association is to be purely or mainly scientific, in the interest of the colleges of pharmacy, pharmaceutical manufacturers and specialists, declare it boldly. If it is an association of pharmacists to "promote the public welfare and tend to mutual strength and advantage," as stated in the constitution, then let us heed the words of Mr. Sheppard, on page 130 of the Proceedings for 1898, "It seems to me this Association wants to do something definite and practical for the retail pharmacist."

Discussion, agitation, as in the past, is all right. "No science, knowledge, improved condition, or progress is ever advanced without the promulgation of some error, and the revelation of intellectual indiscretions and lack of balance." If we have had enough of this discussion, and can

now frame a "model pharmacy law," "unite the pharmacists," and "do something" which will "tend to mutual strength and advantage," let us do it, and ever bear in mind the words of Prof. Remington, as he described the man entitled to full membership in the American Pharmaceutical Association, "This Association is wide enough and big enough to take in all departments of pharmacy."

North Andover, Mass., June 14, 1899.

The paper was received with applause, and, on motion of Mr. Alpers, was referred to the Committee on Chairman's Address.

The Chair announced that nominations for officers of the Section for the ensuing year were now in order.

Mr. Alpers nominated Dr. C. B. Lowe for Chairman. Mr. Ebert nominated Mr. J. A. Koch for Secretary, and Dr. Eccles nominated Mr. A. B. Stevens for the same office.

On motion of Dr. Stewart, the Section then adjourned to three o'clock in the afternoon.

SECOND SESSION—FRIDAY AFTERNOON, SEPTEMBER 8, 1899.

The Section was called to order by Chairman Lyons at 3:20 p. m.

The Secretary read the minutes of the first session. The Chair announced that, without objection, the minutes would stand approved as read, and it was so ordered.

The Chair stated that the next order of business was the election of officers for the ensuing year, and called for further nominations for Chairman. No name being offered but that of Dr. Lowe, nominated at the first session, on motion of Mr. Alpers, seconded by Dr. Rusby, nominations for this office were closed, and Chairman Lyons instructed to cast an affirmative ballot electing Dr. Lowe as Chairman for the coming year. The Chair announced that the ballot had been cast, and Dr. Lowe was duly elected.

The Chair appointed Dr. Eccles and Mr. Good as tellers to take the vote for Secretary. The ballot resulted in twenty-nine votes being cast for Mr. Julius A. Koch, of Pittsburg, and fourteen for Mr. A. B. Stevens, of Ann Arbor. Mr. Stevens moved that the vote be made unanimous for Mr. Koch, and thanked his friends for voting for Mr. Koch, saying that he had already been Secretary and Chairman of the Section and was glad to see Mr. Koch elected. The vote was made unanimous accordingly.

Dr. Whelpley was invited to take the chair while the Committee on Chairman's Address made its report, as follows:

REPORT OF THE COMMITTEE ON CHAIRMAN'S ADDRESS.

The Committee to whom was referred the very able address of the Chairman of this Section, for the purpose of considering and reporting on the various recommendations contained therein, desire to submit the following:

1st. We consider the method suggested by the Chairman for the selection of names for boards of examiners for the various States as excellent in theory, but impracticable. The Chairman himself has pronounced it an ideal possibly unattainable.

2nd. We concur thoroughly with the Chairman in his suggestions regarding the evil of shipping of crude drugs without labels and necessary legislation thereupon.

3d. In reference to the recommendation regarding a scale of prices on goods, we are of the opinion that it is beyond the province of this Association, and, if attempted, it must be by local organizations.

4th. We fully approve the suggestion that the efforts of the Research Committee of this Association be directed more in the line of practical pharmacology.

5th. We heartily approve the following statment in the address: "We think our code of ethics should require that when private pecuniary interests conflict with the higher good of the profession, the former must be sacrificed."

6th. It is the opinion of the Committee that the establishment of a research laboratory and an organ of publication by this Association would be very desirable if the necessary funds could be obtained by endowment, or from sources other than the regular revenues of the Association.

7th. The Committee approves of the reference to the Publication Committee of the American Medical Association of that part of the Chairman's address relating to quackery and pharmaceutical charlatanry.

R. G. Eccles,
A. B. Stevens,
T. D. Reed,
Committee.

Mr. Alpers moved that the report be received, and the recommendations be taken up *seriatim* for consideration and action. Carried.

Dr. Eccles read the first item of the report, dealing with the Chairman's suggestion as to the selection of names for Boards of Examiners for the various States, with the Committee's expression of opinion that the scheme is good in theory, but impracticable. Mr. Mayo, seconded by Mr. Hallberg, moved to adopt.

Mr. Ebert: I want to say that, while it is barely possible that you may find in the Boards of Pharmacy in the respective States proper material for examiners, gentlemen here who are teachers and make a business of examining know that it is one of the most difficult of things. It is a matter absolutely of training on their part to be able to discriminate between those who are qualified and those who are not. This fact was brought out clearly at Chicago in 1893. I did not intend to cast a slur on the Boards of Pharmacy of this country, but it was my honest conviction then, and it is to-day, that as a rule the men who are examiners on the State Boards of Pharmacy were not competent to examine—and I was one of them. These Boards, I grant you, should be selected from the rank and file of the druggists of the State, but they should have power to go out and select such men as are absolutely qualified by education and training to examine those that come before them. That is the point. If the laws in the different States were so constituted that these members of the Boards of Pharmacy should have the right to go out into the State, or wherever they pleased, and make up their commission of examiners and have them examine these applicants, they would make the examination much more perfect, more practical, and much more useful than it is possible to do under the present system.

Mr. Mayo's motion to adopt this recommendation of the Committee was put to a vote and carried.

Dr. Eccles read the second item, regarding the shipping of crude drugs without labels.

DR. LYONS: Let me state exactly what was the recommendation of the Chairman: It is said that it is customary with some houses to ship crude drugs without labels. It seems to me a very reprehensible practice. My suggestion was, that a committee be appointed to investigate the facts, and then to propose legislation to stop the practice, if it exists.

On motion of Dr. Bartley, this recommendation of the Committee was adopted.

Dr. Eccles read the third item, with reference to a scale of prices on goods. Mr. Main moved to adopt the recommendation as read. Carried.

The fourth item was read, wherein the Committee approve the suggestion that the efforts of the Research Committee be directed more in the line of practical pharmacology. On motion of Mr. Prescott, the recommendation was approved.

The fifth item, as to requirement of code of ethics, was read, and, on motion of Mr. Good, adopted.

The sixth item was read, in regard to the establishment of a research laboratory and an organ of publication by the Association. Dr. Bartley moved to adopt.

MR. HALLBERG: This is a recommendation somewhat like one made by me as Chairman of the Section on Scientific Papers in 1892, and, if you remember, a committee was appointed, but failed to do anything. This thought has occurred to me: I believe there are enough pharmacists in this couutry who would be willing to contribute ten dollars a year to the publication of a quarterly journal on pharmacology, each subscriber to get a certain number of copies for the physicians in his locality, to educate them in the advances in pharmacology from a disinterested standpoint. Then, if we had the right kind of an editor, the physicians could be made acquainted with many doubtful points concerning new remedies—they could be cleared up for them. I believe until the pharmacists have some hold upon the literature that the medical men of this country read, we shall never have any great progress so far as relates to these modern remedies and pharmaceutical preparations. If we could have a paper of this sort to tell them what is happening, and to educate them along the proper lines, I believe it would be money that would be brought back a hundred fold. I think a paper could be built up along these lines which would be of vast benefit to the pharmaceutical profession and the medical profession as well.

Mr. Prescott moved to amend Dr. Bartley's motion to adopt the section as read, to the extent that it should be understood that the matter was to be open for further consideration in case donations should be offered towards the establishment of such a journal, and the motion was so put and carried.

Dr. Eccles read the seventh item, with regard to the fantastic nomenclature of the pharmaceutical charlatanry of the day, and the desirability of suppressing it, and stated that the Committee approved of the reference for publication in the Journal of the American Medical Association of the Chairman's remarks on quackery. On motion, the recommendation was adopted.

DR. ECCLES: The Committee also approves of the suggestion that Prof. Beal should draft a model pharmacy law to be reported next year, but was unable to agree on the resolutions offered by Mr. Oldberg and Mr. Sheppard at the morning session, and committed to its care, upon the subject of the qualification of candidates for examination.

MR. BEAL: As I was, perhaps, largely responsible for this matter of a model pharmacy law, since I offered a resolution at Montreal looking to that object, it is due the Association that I should do as much as I can to get this question disposed of. But I would like to present a substitute for the Committee's report. I appreciate the courtesy shown in the selection of my name in this connection, but there are other people in this Association who are entirely competent to deal with this matter, and have done good work along that line, and who know the legal decisions bearing on the matter. I suggest that this law should not be the law of any one man, but of this Association alone, and that it receive the best work, not even of a small committee, but of the entire Association. I propose that we request as many as possible of this Association to prepare a draft of such a model pharmacy law, and present the same for the consideration of the Association at the next annual meeting. This may result in postponing the matter still further, but we have attempted to go too rapidly heretofore and have failed altogether. Perhaps a dozen of these forms might be presented by the members—if not complete laws, partial laws, covering special features. Then the whole could be referred to a committee to remove inconsistencies. I very much hope this motion will be adopted, instead of the recommendation of the Committee on Chairman's Address.

MR. STEVENS: I think Prof. Beal has given us some very valuable suggestions, but I think the original recommendation should prevail, and that he be appointed a committee to draft a model pharmacy law, and that these other drafts that he suggests be sent to him. I believe he is the man to do this work. He is fitted for it by education and training. He has studied law, and has looked into the legal points of the question; and if he has the ideas and suggestions of different individuals furnished him—as I think he has already, for he has sent out questions touching the law all over the country—taking all these things into consideration, I believe he is the very best man to undertake this work. I, also, do not want this law to be the law of any one individual; but we have only one Prof. Beal, just the same, and he is the man to do this preliminary labor. He has all the points fresh in his mind, and I move that we make him a committee to prepare this law.

MR. HALLBERG: I do not desire to rob Prof. Beal of any glory, but I would remind you of the fact that *I* made the first tabular exhibit of the pharmacy laws of the United States in 1891: and since then I have contributed, in conjunction with Prof. Beal, the statistics which have given this Association a fair idea as to the practical requirements of the various pharmacy laws. At the meeting at Minnetonka, after presenting another one of these statistical reports, which was the result of certain other information that was gathered exactly in the same way as has now been proposed by these gentlemen here that want the co-operation on this question, it was decided that a new draft should be gotten up and presented, and I was charged with the work. We had then collected all the information that could be had upon this subject in the United States and Canada. I thought it would be a good idea to add to that the standard of pharmaceutical legislation in the principal European countries, and I studied them carefully—especially that of Great Britain, which is so closely related to us from a legal standpoint—and presented to you a summary of the conditions and requirements of pharmaceutical legislation throughout the civilized world, and especially set out the distinction between the pharmacy laws based upon the legal principles of other countries and those based upon the English common-law principles, and showed you the difficulties of all English-law countries with legislation pertaining to pharmacy and medicine. I then presented also

a summary of the principal fundamental provisions of a pharmacy law which had been approved through desperate efforts. We had endeavored to get the approval of it by every one of the Pharmacy Boards, Pharmaceutical Associations, and even Colleges. We finally succeeded in getting a report from five of the principal State Pharmaceutical Associations. The five principal State Associations, except in one or two minor particulars, approved of these principal provisions—Illinois, Missouri, Pennsylvania, and some other States, you remember. We could not possibly get any expression of opinion from about thirty States out of the entire forty-five. Some few had not had a meeting and could not report. We have all the information now that can possibly be compiled with reference to pharmaceutical legislation in this country and Europe. You will simply waste time by endeavoring to get co-operation on this subject. What is wanted now, as was pointed out at the time this report was presented last year, and as I thought was understood by every one, is a model draft, to be drawn by some one who combines pharmaceutical knowledge and experience with legal education and training. That was the situation then, and it is the same now. I supposed that this matter would be taken up last year and something accomplished, but inasmuch as it was not done, it seems to me now is the time to do it. I feel satisfied that if you adopt the substitute offered you are simply going to go over the whole ground again. What is wanted now is a man of legal mind, and it is fortunate that we have such a man in the Association, who can take all these facts together and present a model pharmacy law that will have force and consistency, and I, therefore, approve of the first proposition, to have Prof. Beal undertake this work, and am against the amendment.

After some further remarks by Messrs. Mayo, Prescott, Good, Remington, Eccles and Lyons, on the great desirability of having Mr. Beal present a draft of a suitable law at the next meeting, the substitute motion of Prof. Beal, that the Section request as many as possible of the Association to prepare forms of a model pharmacy law, to be presented for the consideration of the Section at the next annual meeting, was voted upon and lost.

Dr. Rusby: Now I want to move, by way of amendment or addition to the Committee's recommendation, that Prof. Beal be requested to send a copy of the proposed law to us in advance of the meeting. When we get here we do not have time to consider these matters as carefully as we should.

The recommendation of the Committee on Chairman's Address, as thus amended, was put to a vote and carried, and Mr. Beal was constituted a committee of one to prepare a draft of a model pharmacy law, to be submitted to the Section for its consideration and action at the next annual meeting, copies of the draft, in advance of the meeting, to be sent to the members by mail.

Mr. Sheppard thereupon moved that the Council be requested to make an appropriation for this expense. Mr. Caspari suggested that the Section already had $50 at its disposal to meet such expenses, but the vote was put and the motion prevailed.

Mr. Ebert: I move that Prof. Beal be requested to furnish a copy of the proposed draft to the pharmaceutical press, with request that it be published, so the trade may be notified of what we propose to do.

The motion of Mr. Ebert was discussed at some length by Messrs. Mayo, Remington, Good, Sheppard, Stevens, Thompson, Bartley and Alpers, after which, having been duly seconded, it was put to a vote and carried.

MR. THOMPSON: I move to strike out so much of the original motion as provides for printing and sending out copies of the proposed law in advance of the meeting to the members.

MR. HELFMAN: It is proposed, as I understand, to send the draft of the model pharmacy law to the journals. The journals will be glad to furnish you with any number of reprints required. We will put the matter in type, and then the reprints will involve but a small expense, and I know my paper will be glad to place any number of reprints at the command of the Association.

MR. CASPARI: I hope we will retain this feature, and send a pamphlet copy of this proposed law to each of the members. It is a convenient form in which to present it, and the small expense is scarcely to be considered.

MR. ELIEL: It has just occurred to me, when the question of expense arose, that I could suggest a way where the expense of additional postage could be saved to the Association, and that is, to include the copy of the proposed model pharmacy law with the usual call sent to each member about thirty days before the annual meeting. That could be done at one and the same time.

Mr. Thompson's motion was lost.

Dr. Eccles again read that item of the Committee's report wherein it expressed its inability to agree on the resolutions offered by Messrs. Oldberg and Sheppard at the morning session as touching the qualifications of applicants for examination.

MR. ALPERS: I move that the resolution presented by Mr. Sheppard be adopted.

MR. REMINGTON: I thought this matter was settled at Baltimore. Certainly the sentiment at Baltimore was in the direction of this resolution, and there is no doubt a very great change has come over the views of pharmacists generally with regard to this matter. I do not believe Prof. Beal will find it as difficult as he thinks. Two years ago the Pennsylvania Pharmaceutical Association adopted the recommendation of its President in a resolution to this effect. They re-affirmed it this year. The Ohio State Pharmaceutical Association has also recommended it, and a number of others. And it was upon the action taken by the American Pharmaceutical Association at Baltimore that the matter was brought up. I have not looked through the Proceedings, but I am certainly under the impression that it was settled at Baltimore. However, it would do no harm to pass this resolution, that is, down to the word "Also," the beginning of the second paragraph. That paragraph says it is impracticable at the present time. If we are going to pass the resolution, don't let us draw any part of it back and say it is not practicable.

Mr. Sheppard stated that he would accept the amendment proposed by Mr. Remington, to cut off the second paragraph of his resolution.

The Chair put the motion upon the adoption of the resolution offered by Mr. Sheppard, with the second paragraph eliminated, as proposed by Mr. Remington and accepted by Mr. Sheppard, and it was carried.

Mr. Hynson, seconded by Mr. Hallberg, then moved the adoption of the report of the Committee on Chairman's Address as a whole. Carried.

THE CHAIR: In adopting the report of the Committee on Chairman's Address you instructed the appointment of a committee to investigate the condition of crude drugs shipped without labels. How shall that committee be appointed? What is the pleasure of the Section?

Mr. Stevens moved that the committee be appointed by the Chairman of the Section, and it was so ordered.

Dr. Lyons resumed the chair.

The Chair announced that Dr. Eccles would read a paper upon the subject of controlling the Nostrum Evil, and the doctor read the paper, as follows:

HOW CAN WE MANAGE THE NOSTRUM EVIL?

BY R. G. ECCLES, M. D.

Secrecy and science are as antagonistic as light and darkness. They are the direct antipodes of each other. That which is science is never secret, and that which is secret cannot be science until it ceases to be secret. In so far as science advances human interests, secret things retard such interests. Secrecy is anti-science, and therefore anti-humanitarian. It is the enemy of human progress, the enemy of knowledge, the foe of truth and the antagonist of everything divine. The sole defense of secrecy in pharmacology is selfishness. The only reason why one human being holds as a secret from another something that would benefit that other is to get an advantage that publicity and truth would not warrant. Secrecy in medicine has not a single redeeming feature. It is bad from base to apex. In spite of this fact, pharmacy and medicine are at present under an eclipse by virtue of this monstrous evil. It is at present ruling both professions as if with a rod of iron. Whoever raises his voice in opposition to it in a way that checks its advances is at once singled out as a mark for bitter and unrelenting attack. Its votaries seize on every pretext to do him harm. Secretly, by private communications, they turn his friends against him and seek to even rob him of his means of living by well-framed innuendoes or outright falsehoods. How can we destroy an evil so menacing and of such vast proportions?

Governments do or should exist for the good of those who create them. Justice is the essence of good government and injustice that of bad. By justice each citizen of a government is treated with exact impartiality in everything. Where favors seem to be granted, in a good government an equivalent is returned somewhere. When a monopoly is granted to one holding a patent, it is only for a limited number of years, so that the holder of the patent shall receive as compensation for his work, investment, skill and knowledge a small part of the great gain he bestows upon the race by revealing his discovery or invention. Such a limited monopoly is just and

fair. Not to bestow it would be little less than robbery. When a copyright is given to the author of a book or the producer of a fine picture, the government merely seeks to do an act of justice to the author to enable him to get proper remuneration for his labor. It is but an enunciation of the doctrine that "the laborer is worthy of his hire." When a trade-mark is allowed on a brand of flour, a particular make of shirt, a kind of hat or a new collar, the principle is the same. Society is benefited by the protection in the increased quality and quantity of all such goods which the encouragement brings. The favors are in every such instance reciprocal. But how stands the matter when we have a secret nostrum to deal with? By what theory of justice can so-called patent-medicines claim the right from the government of monopoly trade-marks? Few, if any of them, could at present secure a patent. Why then are they permitted to hold such trade-marks? What benefit is bestowed upon society for such protection? Are we benefited by their keeping their formulas wholly or partly secret? If such secrecy is a benefit to society we should know it. Never before in the history of the world has secrecy, as such, done any good to any one except the selfish holder of the secret. Is it just? Is it fair to permit these people to hold a perpetual monopoly, by government consent, on something that no one knows the full nature of except the man who compounds it? To grant them monopoly trade-mark rights is an insult to every holder of a patent and an insult to the common sense of the community. The patent protection is given as compensation for the revealing of a valuable secret so that humanity can be benefited by it. The trade-mark protection is given as a compensation to nostrum venders, because they refuse to reveal their secrets, whether valuable or valueless, so that society shall not be benefited by them. If the theory on which the patent office was founded is true, then the theory on which nostrums acquire the right to use trade-marks must be false, for it is the diametric opposite. The patent is a potent means of advancing science and civilization. The trade-mark, by being bestowed upon nostrums, is a potent means of retarding science and civilization. The granting of monopoly trade-marks to secret nostrums is a prostitution of justice, a violation of human rights and a defiance of the fundamental principles of good government. The quicker something is done to put a stop to it the better. By concerted action on the part of the great body of pharmacists an end can be brought to this iniquity and great national scandal. Let us have a law prohibiting trade-mark names on everything tainted in the slightest degree with secrecy. Give any one the right to use any name, mark or form of package adopted by the proprietor of a secret remedy. Insist upon the well-known principle of our courts being carried out to the letter in such cases, by declaring that they can secure no redress unless they come forward with clean hands. An inventor who does not reveal the secret of his invention at the patent office can claim no protection in the courts from any who wishes to steal

his secret from him. If an Edison or a Bell had kept the secret of how to make telephones and phonographs from the public, no court in the land could have saved them from the piracy of their employees if they had seen fit to start the manufacture of such goods on their own account. Are the nostrum makers better then than the inventors of good and useful inventions? What right has the court to protect them in doing an act that is clearly an imposition upon the public? Why are they favored far more than any other class of citizens? Let us insist upon every one of the proprietors of nostrums filing the full working formula of each of their preparations before they receive the protection of a copyright, and let us see to it that no fake or in any way imperfect formulas are filed. Make it a crime to attempt such a deception, punishable with a heavy fine, half of which shall go to the informer. Have it sufficient evidence for conviction when three well informed pharmacists testify that by following the directions given they can produce no such product as the one trade-marked. Insist upon the trade-mark being distinct from the name by which the mixture is publicly known. After a definite number of years permit any person to make that same mixture, and sell it by the same name, but do not permit them to imitate the trade-mark of the original proprietor. The public has a right to know his goods from all others as well after as before the expiration of the monopoly. The distinction between this class of goods and genuine patented goods under such law would exist in the fact that the nostrum need not comply with any test of originality or scientific principle, but could be had by any person on anything in the shape of a mixture simply on applying for the same at Washington and paying the fee.

The mere monopoly of the name for a limited number of years would be sufficient compensation to pay them for their time, trouble, cost of advertising the same. If the mixture possessed any particular merit, it would thus revert to the public, the same as if it was patented, as soon as the time allowed for the monopoly had passed. Of course, the proprietors of such preparations will not willingly consent to such an arrangement. It will bring them down to an honest return of value for all the benefit their mixtures can really bestow upon the public. None of them require skillful research for their production. Most of them are prescriptions that at some time have appeared to do good service, and were taken up and exploited on the strength of such accidental results. When the trade-mark was devised it was not intended to give any one a complete monopoly of the kind of goods so marked, but only to protect the producer from having some competitor step in and produce an inferior article and injure his good name by passing off that article of the same kind as his. The fact that courts will protect the owners of trade-marks from piracy even when they have not registered such marks shows that the design is solely to shield the public from fraud by fixing matters so that they can know who made the

goods they are consuming. There never was any intent to confine the making of all of any one kind of goods within the hands of the holder of a trade-mark. The sole aim was to provide a means of distinguishing between A's goods and B's goods of the same kind. The nostrum people have completely subverted the whole aim of the trade-mark law, and made it a means of unjust extortion. This they have accomplished by their holding their formulas secret, and making the name of the mixture their trade-mark.

When the proprietor of Uneeda biscuits seeks protection in court for his goods, you will observe the fact that all the right he claims is that the public may be able by his trade-mark to know his biscuits from some one else's biscuits. The nostrum man is not content with such protection. He insists upon having for ever a full and complete monopoly of all that kind of goods that are made. To give the Uneeda biscuit man the same right, it would be necessary to stop every other biscuit-maker in the world from making biscuits. To bring the nostrum man down to the same kind of treatment as the Uneeda biscuit man, he must be compelled to let others make the same nostrum, but forbid them using his trade-mark of that nostrum. To do this properly, he must not permit his trade-mark to be the name of the nostrum, but only the name of his make of it. The sole intent of the trade-mark was to provide just such protection as men like the Uneeda biscuit man ask for, but the nostrum men go wild when any one suggests that the public owes them no more consideration than it does the generality of its members. They have for so long a time been permitted to take an advantage of every body that no one else has ever dared to do, that they deem it their right and insist upon it.

The same condition of things existed in the Mediterranean ports when the Corsair was interfered with. He thought it perfectly just and right to scuttle ships, kill their owners and steal their goods. It was his means of livelihood, and he thought and said that the French were an awfully mean set of men to interfere with his bloody diversion and stop paying for the privilege of having their ships let alone by these cut-throats. No matter how unjust or evil an act may be, those who have practiced it unchallenged for a long time really come to believe it right. As the Corsairs were able for many years to terrorize the whole civilized world, and compel even Great Britain to bow to their will and to pay the ransom, so the patent medicine men can now hold up State legislatures, make laws suitable to their free-booting; but the time will soon come when they will have to quit such injustice. Let the American Pharmaceutical Association act as France acted by the Corsairs, and fight this thing to the death. Let them be treated justly. Give them all the rights that others enjoy, but no more.

The Chair stated that before proceeding to the discussion of the paper Dr. Stewart would be asked to make a statement as to the points in the

report of the Special Committee on National Legislation, referred to this Section by the Association in general session, bearing upon the subject-matter of the paper just read.

Dr. Stewart thereupon explained at length some of the features of the report pertinent to Dr. Eccles' paper, and read from the code of ethics of 1854 and the Constitution of the Association.

MR. EBERT: At the Cincinnati meeting in 1887, when we reorganized, the code of ethics was discussed, and we concluded we would place in our constitution such ethics as were necessary, and that code of ethics was dropped.

THE CHAIR: The report of the Special Committee on National Legislation is before you for discussion, gentlemen. This report was referred to this Section by the Association. Comment must be made now.

DR. ECCLES: In regard to the report of the Committee I would say, that I find a general misapprehension of the legal situation with respect to this matter of patents. Here in the United States our process of conducting trials in court is wholly different from those prevailing in Europe, as we have just seen in the case of Dreyfus in France. In France a person is held to be guilty until he proves himself innocent. In this country he is held innocent until he is proven guilty. It is utterly impracticable for us to protect a process patent in this country, because any one can claim to have a process differing from it, and you must prove that the process by which he manufactures is the same as yours before you can get redress, and that cannot be done. Hence, it leaves every patent open for piracy. There is in the courts no redress that is available. There is but one possible way to overcome it, and that is to do away with our fundamental legal principle and adopt the European principle. You can protect a process patent in Europe, because a man is compelled to prove that he is innocent. I do not mean in England—although their tendency is toward the Continental method. So here is the trouble with us, that it is open to piracy in a thousand directions, because of this fundamental principle of holding a man innocent until he is proven guilty, instead of the reverse.

MR. HALLBERG: I believe the proposition resolves itself into three fundamental elements: first, the trademark; second, the process patent, and, third, the product patent. If we would take these up consecutively it would expedite matters very much. I would suggest that we take up the trade-mark question first, and settle that; then the process patent; then the product patent. Let us settle them one at a time. The product patent is the one that is so doubtful. I make a motion to that effect—that we take up, first, the question of trade-marks; second, the question of process patents; third, the question of product patents.

The motion was put and carried.

DR. STEWART: The question of trade-marks divides itself into two parts—the question of trade-marks on unpatented medicines, and the question of trade-marks on patented medicines. I have the legal status of both set out here in the report of the special committee, and I can read it or not, as you please. The best decision bearing on the first proposition—and I have a number of them here—is one taken from Kerley's work on the Law of Trademarks.

Dr. Stewart here read copious extracts from the report of the Special Committee on National Legislation bearing upon his subject.

After a number of resolutions, offered by Messrs. Hynson, Hallberg and Stewart, looking to the regulation and restriction of trade-marks by the Government, had been discussed and withdrawn, the following resolution proposed by Mr. W. S. Thompson was unanimously adopted as expressing the sense of the Association on this subject.

Resolved, That the United States Government be requested not to permit the registration of words as trade-marks that may be used as the generic or specific name for the article itself, but that symbols or figures only shall be registered as trade-marks.

DR. ECCLES: Now I move that we disapprove of the registration of any trade-mark of any medicine, the composition of which is kept secret.

The motion was seconded by Mr. Ebert and carried.

MR. HYNSON: It has been said to me several times about this Association, that we can do nothing about these matters. That seems to me to be absurd. Because we cannot change the laws is no reason why we should not express our sentiments; and if we cannot express them and lend our influence in bringing about much-needed reforms, we had better go out of business.

MR. SHEPPARD: We are all interested in phenacetin, and I am reminded here to say, that a first-class lawyer in Boston told me that if any one would guarantee him $10,000, he would guarantee the phenacetin patent would be knocked out. He said it was purely a game of bluff.

MR. HALLBERG: I move that the Association approve of the patenting of processes, according to the law.

Dr. Stewart seconded the motion.

MR. THOMPSON: I would suggest changing the motion to say, that we recommend that the law granting process patents be so amended as to protect the patentee—that we petition the Government to that effect. That, as I understand, is the position we have taken in regard to this matter.

Mr. HALLBERG: I accept the substitute.

DR. ECCLES: I see no possible way of doing it, because of the fundamental principle of law I have referred to as prevailing in this country, whereby a man must be considered innocent until the reverse is proved. That is what you must do to protect a patented process, and it is impossible.

Mr. Thompson's motion was put and carried.

The Chair named as a Committee to Investigate the Question of Shipping Crude Drugs without Labels: Messrs. Eliel, Helfman and Ebert.

Upon motion of Mr. Mayo, the Section then adjourned to 8 o'clock, P. M.

THIRD SESSION—FRIDAY EVENING, SEPTEMBER 8, 1899.

The Section was called to order at 8:30 P. M., by Chairman Lyons.

The Secretary read the Minutes of the Second Session, which, there being no objection, were declared to stand approved as read.

Dr. Bartley moved that Dr. Stewart be instructed to transmit the recommendation of this Section as to restriction of trade-marks to such Government authorities as he thinks advisable and proper. The motion was seconded and carried.

DR. ECCLES: I move that the Association approve of product patents, and that in submitting this recommendation to these parties, Dr. Stewart be also permitted to state that, in the opinion of this Association, the granting of patents on products should be allowed.

Mr. Eliel seconded the motion.

DR. BARTLEY: I am not very clear on this subject. Will Dr. Stewart define the full import of that term "product patents?"

DR. STEWART: I will do so by reading what Prof. H. C. Wood, President of the National Convention for Revising the Pharmacopœia, has to say on this subject.

Dr. Stewart here read at length from the Report of the Special Committee on National Legislation in explanation of this matter.

After a lengthy and somewhat spirited discussion of the subject of product patents and the desirability of an expression of approval on the part of the Association, participated in by Messrs. Hallberg, Bartley, Eccles, Hynson, Alpers, Remington and Stewart, it was finally, on motion of Dr. Bartley, agreed to lay the whole subject on the table.

The reading of papers was called for, and Mr. H. B. Mason presented the following:

A PLEA FOR THE INTRODUCTION OF DOSES INTO THE PHARMACOPŒIA OF 1900.

BY HARRY B. MASON.

There are many good reasons why minimum and maximum doses should be incorporated in the next Pharmacopœia, and no good reason, I believe, why they should not. That their presence in the Pharmacopœia would undoubtedly increase the popularity of the book is reason enough in itself for their introduction. During the six years which have elapsed since the publication of the present revision, a feeling has constantly been growing that the book should be so changed in character, or so broadened in scope, that it would spring into more general use among pharmacists and physicians. The Pharmacopœia is a book which prescribes standards for the character, quality, strength and comparative purity of medicaments. It is created by the professions of pharmacy and medicine, and it has the authority and the influence which only entire representation can give. The government has accepted it as the national standard; manufacturing chemists and pharmacists make their products in conformity with its requirements; text and reference books in materia medica and pharmacy are based upon it; pure food and drug laws are based upon it; judges are guided by it in making their decisions. In view of its virtual

authority as the book of standards to which medicaments must conform, and in view of the fact that it is created by the professions of pharmacy and medicine for the use and guidance of both, the Pharmacopœia should surely be in the hands of every pharmacist and every physician in the country. But is it? Alas! scarce one pharmacist in ten and one physician in a hundred has it in his library. Above every other consideration, then, should we not sanction any rational change in the Pharmacopœia which will give it wider popularity?

The introduction of doses, among other things, would do much to increase the usefulness of the Pharmacopœia and would, therefore, materially increase its popularity. There is little in the present Pharmacopœia to interest the average physician. He cares nothing for descriptions, tests and processes of manufacture. He wants information along medical lines, and he will not buy nor consult a book which fails to give him this information. If he is in doubt about the dose of some toxic remedy, and, knowing that the Pharmacopœia is the recognized book of standards, turns to it with trust only to find it silent, he will discard the book as useless to him. It is this very lack of usefulness to the physician, with respect to doses and other things pertinent to his needs, which has prevented the Pharmacopœia from being popular with medical men. The notion has gone abroad that the book is a pharmacist's book, and that it has no value for the physician; and the consequence is that physicians are deplorably ignorant of its character.

This ought not to be. The Pharmacopœia should not be unread and unknown by the great majority of physicians. Just to the extent that it is unread and unknown is its very purpose defeated. And from a selfish point of view there are reasons of the most vital character why Pharmacy cannot afford to allow such a condition of things. The one great reason why the vast horde of proprietary medicines of every kind have been taken up with such acclaim by physicians is because they are ignorant concerning the Pharmacopœia and its authoritative character. A knowledge of the Pharmacopœia spread among physicians would do much to restore prescribing to official medicines, and thus restore pharmacy to the pharmacist. Moreover, a greater use of the Pharmacopœia, which is the joint work of both pharmacists and physicians, would go far toward bringing the two professions together, to the profit and pleasure of both, and to the enhancement of medical science.

But the introduction of doses into the Pharmacopœia would not only increase the use of the book among physicians; it would likewise increase its use among pharmacists, which is quite as necessary and desirable. The Pharmacopœia is essentially the guide-book of the pharmacist, and yet, unfortunately, it is too seldom found in his library. His excuse is that "it contains nothing but what is in the Dispensatory." This is not true, and as an excuse it is certainly not sufficient; but the pharmacist will

nevertheless continue to slight the Pharmacopœia and to give this excuse unless the book is made more directly useful to him. Doses are of major importance to the pharamacist, and it is their absence from the Pharmacopœia, more perhaps than anything else, which has prevented him from using the book to a greater extent. His most important duty, in connection with every prescription which he dispenses, is to see that the physician has not, through either carelessness or ignorance, prescribed excessive doses; and a book which professes to be his guide, but which does not guide him in this important duty, fails to impress him as a book invaluable to him. Perhaps, after all, he is not much to be blamed if he prefers the Dispensatory because he finds it to supply what the Pharmacopœia lacks, if not as authoratively or as accurately as the Pharmacopœia would. And in this preference of the average pharmacist for the Dispensatory is a hint which we think the revisers of the Pharmacopœia of 1900 should put in their pipes and smoke on long and deliberately.

That both pharmacists and physicians have in truth been disappointed in the Pharmacopœia because it did not contain doses, and that they would like to have it contain them, has been well proved by their responses to inquiries which have been sent out to them within the last year or two. When asked whether doses should be included in the Pharmacopœia, 264 out of 311 Missouri physicians replied in the affirmative; and the Committee of the U. S. P. of the New York State Medical Society, which has for two years been striving to obtain the opinion of medical men anent the Pharmacopœia, received such a preponderance of replies in favor of the introduction of doses that it recommended this step, among others, in its report to the society. So much for the evidence of physicians. Of 62 Ohio pharmacists to whom the same question was submitted by a committee of the State pharmaceutical association, only one replied in the negative. There is little doubt, then, that if doses were to be introduced into the Pharmacopœia (particularly in connection with other changes made for the same reason, such as the introduction of the more important synthetics) the book would be looked upon with much more favor by pharmacists and physicians generally, and would in time spring into a much larger use.

Not only is the introduction of doses into the Pharmacopœia desirable for the reason that it would greatly increase the use of the book; it is desirable and necessary for its own sake also. There should certainly be some authoritative standard of posology. The physician should have some guide which represents the crystallized experience and opinion of his profession, and the pharmacist, whose duty it is to act as safeguard to the physician, and who is held responsible if he fails to discharge this duty, should have some definite and authoritative means of judgment. The Pharmacopœia sets the standard of medicaments in all respects save that of doses; it should, in view of its necessity and importance, set the

standard in this respect also. This has been realized by the pharmacopœial revisers of other countries. The English, the German, and nearly every other Pharmacopœia save that of the United States, contains doses.

Against the introduction of doses into our Pharmacopœia three objections have been urged. First, that if the prescriber exceeded the dose designated in the Pharmacopœia, he would perhaps render himself amenable to the law for so doing, if, perchance, the patient should die, or if some enemy should bring suit against him for malpractice. This objection is more academical than practical. It is based more upon fancy than upon fact or reason. In the first place, a prescriber would so very rarely exceed the maximum U. S. P. dose that the point is scarce deserving of any consideration. Indeed, he would almost never exceed the maximum U. S. P. dose, except in giving an antidote in case of poisoning, or, perchance, in giving morphine to a morphine habitué. But even supposing, for argument's sake, that he should do so, and that he would immediately be sued by some designing enemy lying in wait, he would have no difficulty, if he were really innocent of harm, in proving his innocence to the court. If his act had not been within the bounds of science and reason, he must of course expect to suffer the consequences, and should indeed be made to suffer them; but if he had acted competently he could readily show sanction of his act in the book of some prominent therapeutist. The Pharmacopœia is a book of standards, true; but there is nothing to prevent the physician from departing from its standards if he so desires. If he prefers to use a tincture of digitalis which is twice the pharmacopœial strength, he renders himself liable to no legal punishment. Similarly, he might with impunity exceed the pharmacopœial dose of any medicine so long as he does no harm thereby. And if he does harm, and is punished for it, he is not punished because he violates a standard of the Pharmacopœia, but because through incompetence or carelessness he endangers or destroys life. But to make doubly sure immunity from punishment for exceeding a given pharmacopœial dose, the doses could be so stated as clearly to give the prescriber liberty to exceed them in the very rare cases where it would be necessary. Perhaps a clause to this effect, inserted among the "Preliminary Notices," would serve the purpose.

The second objection which has been made against the introduction of doses is that the Pharmacopœia is a book of arbitrary and definite standards; there can be no arbitrary and definite standard in doses, because scarce any two authorities in therapeutics state the same dose of any given medicament. This, I believe, is an erroneous conclusion drawn from an exaggerated statement of fact. The disagreement between medical authors in the giving of doses is not a vital one. In the comparatively few cases in which it is found, it is most often in connection with non-toxic drugs, which do not much matter, and rarely with toxic drugs, with which the

question of dose is one of importance. Moreover, this disagreement is usually with respect to average doses and not maximum doses. The disagreement between medical writers over maximum doses, particularly of those drugs in which the matter is one of importance—the toxic drugs —is not enough to prevent the medical members of the Revision Committee from deciding upon doses which would not only represent the consensus of opinion, but which would be as near to scientific accuracy as is possible in posology. But even if it were possible to get only what might be termed approximate doses, these would serve the purpose. For the purpose is to get doses which are representative of general practice and experience, and which will enable the pharmacist to know authoritatively when an excessive dose has been prescribed, but which the physician may depart from in those rare cases where he deems it necessary, indicating on the prescription, by a star or exclamation point, that an extraordinary dose has *purposely* been ordered, as he should always do when ordering such a dose.

The third objection which has been urged against the introduction of doses into the Pharmacopœia is that they are entirely foreign to the original purpose and scope of the work. The purpose of the Pharmacopœia, it is argued, is to prescribe standards for the selection, preparation, nomenclature, character, strength and purity of medicaments contained therein; it has nothing whatever to do with the use, therapeutic or otherwise, of these medicaments, any more than the national law which prescribes the standards of the gold dollar has to do with the number of gold dollars which shall be paid for a day's work. Let me say in passing that this comparison is in truth misleading; the conditions in the two cases are not at all the same. But it is not my purpose to argue whether the introduction of doses would conform to the original purpose of the Pharmacopœia or not; this, to my mind, is a point of minor importance. I hope I am no iconoclast. I trust I have due respect for tradition. But I think that when we fail to recognize that tradition grows out of the conditions of the past, and that it cannot apply without modification to the conditions of the present if these have materially changed, we are devoid of that power of adaptability which has always and will always determine the survival of the fittest; we show ourselves incapable of meeting new conditions and of realizing that "the times change, and that we must change with them." If the Pharmacopœia were the product of a single author, and intended only for whosoever might choose to buy it, as the myriad of books are, a narrow scope might be desirable. But the Pharmacopœia, on the contrary, is a book of standards created by the professions of pharmacy and medicine, and as such it is intended to be used, and should be used, if it is to succeed fully in its purpose, by every pharmacist and physician in the country. It has been proved that the traditionally narrow scope of the Pharmacopœia has prevented a more general use of the book;

that the pharmacist, and more particularly the physician, does not often consult it because he finds it of too little service to him. In the face of this experience shall we continue the old policy? Shall we refuse, with both eyes open, to extend the scope of the Pharmacopœia, when we have the best of reasons for knowing that such action will materially extend its usefulness and therefore its popularity, and will not be in any way detrimental? Which is better, to have the Pharmacopœia conserve the ethics of the revered men who established its policy decades ago, and have it lie unpurchased and unused by the great majority of pharmacists and physicians, or to relinquish some of these now musty ideals, and so conform it to the demands and needs of the pharmacist and physician of to-day that it will spring into a larger and better use? Of what value is the Pharmacopœia, I should like to ask, unless it is used? Of what value is medicine to a patient, if he will not take it?

There is no good reason why doses should not be introduced into the Pharmacopœia of 1900. There are many good reasons why they should be so introduced. Pharmacists want them; physicians want them. They would tend materially to bring about that general use of the book for which it is designed and upon which its success depends. They would, by virtue of this increase in the use of the book, improve pharmaceutical practice by an inevitable increase in the prescribing of pharmacopœial preparations. Beside this, doses in the Pharmacopœia would benefit medical science. They would increase exactness and accuracy in medication. They would give the pharmacist that authoritative guide of which, as safeguard to the physician, he is in great need, and with which the Pharmacopœia, as the authoritative book of standards, should supply him. With no good reason why the step should not be taken, and with several good and potent reasons why it should be taken, will the pharmacopœial convention of next May refuse to incorporate doses in the pharmacopœia of 1900? Will it refuse to do what the pharmacopœial revisers of nearly every other country have recognized as necessary, and have done?

MR. HALLBERG: I suggest that we should not sanction the scheme of designating the quantities beyond the Pharmacopœia limit, as recommended by Mr. Mason in his paper, namely, the affixing of a star or exclamation point after the figures. They have been discarded by other Pharmacopœias. The star is liable to be taken for X, the Roman numeral for 10; and the exclamation point for 1. I think the best plan is to underscore the quantity. That is a method now largely in vogue. I would like to ask Mr. Mason his object in stating a minimum dose.

MR. MASON: Because that seems to be the custom in the foreign Pharmacopœias. I was influenced by the British Pharmacopœia in that. I do not know that it is important.

MR. EBERT: I move to receive the paper and refer to the Committee on Publication. And I hope somebody will recommend that it be referred to the Pharmacopœia Committee.

The motion was seconded by Mr. Remington, and prevailed.

MR. SHEPPARD: I move that we pass a resolution that it is the sense of the American Pharmaceutical Association that doses should be included in the Pharmacopœia of 1900. Let the Convention decide whether they will state minimum and maximum doses.

Dr. Stewart seconded the motion.

Quite a spirited discussion arose in regard to Mr. Sheppard's motion, which was participated in by Messrs. Ebert, Alpers, Hallberg, Remington, Sheppard, Reed, Hynson, Fennel, Eccles, Carter, Stevens and Whelpley. Finally the motion, as originally made, was put to a vote and carried.

Mr. Whelpley submitted the following report as to the use of the metric system in prescriptions throughout the country, the report being a continuation of a similar report made last year:

"REPORT ON THE USE OF THE METRIC SYSTEM IN 545,000 PRESCRIPTIONS."

BY H. M. WHELPLEY, M. D.

This report is a continuation of the one made on page 303 of the American Pharmaceutical Association Proceedings for 1897, and page 452 of Proceedings for 1898.

Since the last meeting I have heard from 545 pharmacists distributed in the cities and towns of forty-two States and Territories.

No store reported on more than 1,000 prescriptions, and in each case on the last 1,000 on the prescription file.

While the report this year covers about the same States and Territories as last, and in many cases the same cities and towns, the statistics come from prescription files not reported last year, nor in 1897, so that these figures can be considered as a further report upon the subject.

Of the 545,000 prescriptions analyzed, 5.98 per cent. were written in the metric system.

I have now reported on 1,008,500 prescriptions, containing an average of 6 per cent. in the metric system.

Some of the comments made by pharmacists reporting may prove of interest. I select from them as follows:

"The metric system is a failure."

"Our physicians are satisfied with the old system of weights and measures. They want no guess-work in compounding their prescriptions."

"I am in favor of the metric system. I wish the law would be enforced."

"The metric system is non-American and non-patriotic."

"Our doctors never liked the system."

"No use for both systems. Let it be all metric or none, and no decimal points allowed to be used."

"I am glad to say no metric system prescription is on my file."

Dr. Whelpley also presented the following report upon the Use of the Metric System in Boards of Pharmacy Examinations, explaining that last

year he made a report on the use of the metric system in medical colleges :

A REPORT ON THE USE OF THE METRIC SYSTEM IN BOARD OF PHARMACY EXAMINATIONS.

BY H. M. WHELPLEY, M. D.

I feel that a report of this kind will prove of historic value as well as of present interest.

In the following list of states, territories and colonies of the United States, those without a Board of Pharmacy are marked 1 ; those having a Board of Pharmacy which makes use of the metric system on examinations, are designated by the figure 2 ; those Boards not using the metric system are marked 3 ; and those failing to respoud to my several letters of inquiry are marked 4.

Alabama 2.
Alaska 1.
Arizona 1.
Arkansas 2.
California 2.
Colorado 2.
Connecticut 2.
Delaware 2.
District of Columbia 2.
Florida 2.
Georgia 2.
Hawaiian Islands 1.
Idaho 1.
Illinois 2.
Indian Territory 1.
Indiana 2.
Iowa 2.
Kansas 2.
Kentucky 2.
Louisiana 2.
Maine 2.
Maryland 2.
Massachusetts 2.
Michigan 2.
Minnesota 2.
Mississippi 2.
Missouri 2.
Montana 2.
Nebraska 2.
Nevada 1.
New Hampshire 2.
New Jersey 3.
New Mexico 2.
New York 2.
North Carolina 2
North Dakota 2.
Ohio 2.
Oklahoma 3.
Oregon 2.
Porto Rico 1.
Pennsylvania 2.
Philippine Islands 1.
Rhode Island 2.
South Carolina 2.
South Dakota 2.
Tennessee 2.
Texas (has a Board in each Congressional District.)
Utah 2.
Vermont 2.
Virginia 2.
Washington 2.
West Virginia 2.
Wisconsin 2.
Wyoming 4.

On analyzing this report, I find that one state, New Jersey, and one territory, Oklahoma, report that they do not use the metric system in Board of Pharmacy examinations. Many Boards have submitted to me lists of their questions, and the following examples will give a fair idea of the character of the questions asked on the metric system :

1. If an adult dose is 0.37 Cc., how much should be given a child of 7 years, and to a child 2 years old?

2. Write a prescription making use of the metric system. Write it, using the apothecaries' equivalents.

3. How many grains in 1.0 gram ; 500.0 grams?

4. Write in the metric system a formula for 24 compound cathartic pills.

5. How many grams in 550 centigrams?

6. If 500 grams of chloroform, specific gravity 1.500, cost 75 cents, what would be the price of a liter?

7. How many grains, approximately, of quinine sulphate, are in one tablespoonful of a solution of 4 fluid ounces containing 2.00 grams?

8. Write out the table of apothecaries' weight. What is the unit of weight in the metric system? Give its equivalent in the apothecaries' weight.

Some of the comments accompanying reports made by the Board of Pharmacy, are worthy of note. The Georgia Board, in a circular to prospective candidates, says, "Be sure and study up the metric system of weights and measures."

The Missouri Board says, "We hold that every pharmacist should be able to convert metric weights and measures into troy weights and fluid measures, but we oppose such conversions being made when compounding prescriptions or making preparations. We recommend that the weights and measures of that system called for by the formula be used in compounding."

Michigan reports, "Strange to say, we find some yet that cannot tell the equivalent of a gram in apothecaries' measure."

Kentucky says, "The metric system is not universally understood by the applicants."

New Mexico reports that applicants are not as well posted on the metric system as they should be.

New Hampshire, "Candidates do not take kindly to the metric system at all."

Of those Boards reporting the use of the metric system, a majority state that it is used on every examination and for each applicant.

On motion of Mr. Sheppard, seconded by Mr. Ebert, the papers were received and referred for publication, with thanks to the author for the great amount of work he has done on them.

MR. REMINGTON: I think the future of the metric system depends on the attention given this matter in our public schools, and I think anything we can do to help the school children to acquire a knowledge of this system will be time well spent.

MR. RYAN: As I happen to be chairman of the Committee on Weights and Measures in the Metric System, I want to say that we should do all in our power to get this system taught to our students in the colleges—teaching that and nothing else. Mr. Caspari tells me he sent the resolutions of last year to every medical college in the country, and, I am sorry to say, received replies from four of them only in regard to it. Until the medical colleges teach the metric system to their students from the beginning, it will never be introduced successfully, in my judgment.

MR. EBERT: So far as our medical school is concerned—the one with which I am connected—it is the plan to begin it with our students at once, and continue it for four years.

MR. HALLBERG: I am supposed to be one of the members of this committee on the

metric system. Why did not Prof. Ryan write to me to find out why the metric system was not taught in the medical colleges in Chicago? We have twenty-eight of them. I could have lined up a great majority of them for the metric system. The Secretary certainly should not do this work when we have members right in a city on this work.

MR. RYAN: The intention of the resolution passed at Baltimore last year was not that it should be sent to the medical colleges direct, but to the American Medical Association, Section on Therapeutics, and get its sanction first, and then it was to be vigorously canvassed with the medical colleges upon its recommendation. I think, however, the intent of the framer of that resolution was changed, and the Secretary directed to send it to the medical colleges; therefore, it did not appear at the Medical Association meeting at Columbus, much to my surprise. Consequently, I had no expression from them to aid me in going on with my work.

DR. BARTLEY: I received that circular, and tried to secure some unanimity of action in our State; but I found, after making the effort, that only one or two taught it there, and the rest refused.

Dr. Whelpley moved that the paper of Dr. Eccles presented at the afternoon session, upon the subject of the nostrum evil, be received and referred to the Committee on Publication. Carried.

The Chair announced that the time for the installation of officers had arrived.

Mr. Alpers, at the request of the Chair, brought forward and introduced Dr. Lowe as the new Chairman. Dr. Lowe said:

Gentlemen of the American Pharmaceutical Association: I recognize very deeply the high honor you have conferred upon me. It is with considerable reluctance that I take the position, because I am not only aware of the honor but the work necessary to sustain it. Too often we are induced to take positions without fully considering the work belonging to those positions, and make lamentable failures in so doing. Thanking you very much for the confidence you have manifested towards me, and hoping I may be able to show it has been justly bestowed, we will now proceed to other business, as the hour is getting late.

Dr. Lowe having taken the chair, Mr. Alpers introduced Mr. Koch, of Pittsburg, as the new Secretary of the Section—"A new man, but a good man."

MR. KOCH: I simply beg to thank you for the honor you have done me. I assure you I appreciate it, and will endeavor to the best of my ability to carry out the duties you have entrusted to me.

MR. GOOD: I believe it is customary for the two officers elected to name their associates on the committee.

THE CHAIR: We are not ready to name these now, but they will be named before we leave Put-in-Bay.

MR. HALLBERG: I move that the officers of the Section be requested to present a plan for a basis of preliminary education for admission to a college of pharmacy; and, if possible, also a standard curriculum.

The motion was seconded by Mr. Mayo and carried.

Mr. Kremers offered the following resolution:

Recognizing the therapeutic importance of many patented synthetic products, as well as the necessity of authentic information on these substances, the Section on Education and Legislation of the American Pharmaceutical Association would recommend to the Convention for the Eighth Decennial Revision of the United States Pharmacopœia that the fact that a substance is patented be not allowed to stand in the way of its adoption into the Pharmacopœia, if otherwise desirable.

After discussion by Messrs. Hallberg, Sheppard, Good, Bartley and Kremers, the resolution was, on motion of Dr. Bartley, seconded by Mr. Ebert, laid on the table.

MR. HALLBERG: I move a vote of thanks to the retiring officers for the faithful performance of their duties during the last year.

The motion was heartily seconded by several members and was carried.

Mr. Hallberg moved that the reading of the Minutes of this Session be dispensed with. Carried.

Dr. Lyons moved that the paper of Prof. Scoville on "Examinations" be read by title and referred for publication. Carried.

The paper is here given:

EXAMINATIONS.

BY WILBUR L. SCOVILLE.

Amongst the aphorisms of pedagogics there is none more familiar or more frequently quoted than the saying of Euclid, "There is no royal road to learning." It comes early to the student, and is the last from which he escapes. It justifies all his tasks, and explains all his failures; and yet every examination given him contradicts it. For what is an examination but an attempt to learn that most complex and difficult of all erudition, the capabilities and attainments of a human mind, and that in the brief space of a few hours? This contradictoriness is usually recognized in school life by both teacher and pupil, and an examination is there regarded as but a confirmation of judgments previously formed, and needing some endorsement.

Where an examination marks the entire contact between examiner and candidate, there is of necessity a feeling that the examination, however thorough and fair, is not all sufficient, and there may be a vague sense of injustice. The advantages of an examination are much more easily defined than its limitations, though the latter may be clearly felt. In all discussions of the subject a recognition of the inevitable limitations, as well as the advantages, is necessary to a just criticism, and much depends upon where these limitations are placed. It should be conceded that there is a point beyond which one cannot go, and that this point affects all, whatever their attainments and abilities. Human methods are

never perfect, and while we may and should strive to attain to the highest degree of perfection, we can lose nothing by recognizing our necessary and universal limitations.

This element of time in examination is both an advantage and a disadvantage. It is an advantage in that it gauges the ready knowledge of the candidate, and a disadvantage in that it necessitates a judgment by the examiner based upon a superficial reception of evidence.

If the expression of Euclid be true, and there is no quick and easy road to learning, then the principle applies as well to one as to another, and the examiner is using methods which he condemns in others. The fact that his larger experience and wider knowledge enables him to form a true judgment more quickly, and that the conditions demand the present forms of examination, may justify the examination itself, but they cannot justify its results. And the examiner who recognizes this will depend less upon a set of questions and a marking system, both of which may emphasize this defect, and more upon his powers of observation and comprehension for his final judgment.

When President Robinson of Brown University was petitioned by his students to abolish the marking system, he replied that the defects of the present system were recognized and taken into consideration, but that some system was necessary, and the present must stand until a better could be offered. A recognition of defects does not eliminate them, but it does mitigate them.

A set of questions, however well selected, does not constitute an examination. Much emphasis has been placed, and rightly so, upon the selection and phraseology of papers. But there is something back of this which may almost nullify an ideal set, and that is the conception of not only the questions but the art or science which they represent in the minds of both the examiner and examined. The selection and phraseology of the questions will usually indicate the examiner's conception of the subject. The examiner's own comprehension of the examination is an integral, though unwritten, part of it.

The candidate recognizes this, and seeks to meet it. If the questions are clear and of plain intent, his opportunity is fair in that respect. But if there be even a slight ambiguity in a question, either as to its intent or its subject, the candidate may thereby be robbed of his opportunity to show his knowledge. No examination can include more than the competency of the examiner, so far as its results go. For whatever the questions may show of the examiner's knowledge, his judgment of the answers will the more rigidly indicate his conception of the subject. It is much more difficult to judge and mark answers fairly than to frame questions, and it is more of a tax on one's knowledge. There is a sense in which an examination is simply a comparison of the mental attitudes and attainments of the examiner and the examined, with the privilege of judgment accorded

to the examiner. Narrow-mindedness on the part of an examiner may thus be as much a cause of a candidate's failure, as lack of knowledge on the part of the candidate.

Pharmacy is suffering from a system of fragmentary education, which has tended to make its students slaves to details rather than masters of facts. This fragmentary system has a strong hold, even at the present time. It explains the influence of the quiz-compend and the excessive demand for practicality. Preaching against the quiz-compend will be of little effect, if its system be adopted in examinations; and we need to be very careful that the legitimate demand for things practical does not develop into a mania against things comprehensible.

The true gauge of a candidate's knowledge is shown not so much in the direct answers which he gives to questions as to the comprehension which he shows of a subject. It is even possible to get contradictory indications in this regard. Every teacher, perhaps, has marked that peculiar type of mind which becomes perverse under the stress of excitement—which insists, when under a strain, in saying just the opposite of what it should say; which directs a reducing agent to be used where an oxidizing agent is needed, or an acid treatment where an alkali is indicated; which would heat a condenser and cool the retort, and yet throughout shows a grasp of the principles required, and makes an adaptation of them, in opposite, to the ends desired. Such a student never secures a high marking, yet he is often efficient, capable and thoroughly at home when he can use his hands instead of his tongue or pen. He rarely, if ever, passes an examination in the literal interpretation of that term, but he succeeds in spite of the examination, because the examiner considers his attitude of mind and capabilities, as well as the details of his knowledge. To do justice to all the varieties of mind at once is not an easy task, but this fact simply emphasizes the need of a greater comprehension and sympathy in the examiner.

How far the memory should be taxed in an examination, or rather how to avoid overtaxing it, is one of the most difficult of problems. The human mind was never intended for a storage warehouse for facts, and yet a certain stock of facts must be kept on hand or it is inefficient. The judgment is a much better criterion of a candidate's ability than the memory, but judgment must depend in part upon memory. They cannot be separated, nor can a line be definitely drawn wherein one becomes independent of the other.

At best, however, memory is a treacherous factor, and under the stress and excitement of an examination it is especially likely to prove untrustworthy. To make it the sole indication of one's attainments at such a time is obviously unfair. Moreover the possession of facts does not necessarily imply the ability to use them intelligently. Indeed, it is quite possible to so crowd the mind with facts that they become a source of confusion rather than of intelligence.

In his inaugural address to the students of the London School of Pharmacy last October, Sir. James C. Browne used these words: "We are suffering largely in this country from a stupidity that has been manufactured by examinations, and I do not doubt that a point may be reached in the examination of chemists and druggists that will conduce to dulness rather than alacrity of thought; that will sacrifice to temporary mental engorgement with a subsequent life-long disgust at learning." These words are applicable here and are worth pondering. An over-developed memory seldom accompanies an active mind, and the judgment and thoughtfulness is of more value than the memory. The latter can be substituted by the library, but the former cannot. The ability to use books intelligently and to some purpose is of far more value than the absorbing of their contents. The printing press is cheaper and more reliable than the human encyclopœdia.

Memory depends upon physical conditions, connections and impressions, and an imperfection in any of these will detract from the memory. Who cannot remember of an examination question lost because one link in a chain of facts has slipped from the mind, the rest remaining? Would it be a wise policy to require a clerk to call by name the first twenty regular customers who should come into a store at a given time, and make that requirement a criterion of his value as a clerk? It would undoubtedly have some value, but the ability to connect names with faces is not the only desirable consideration. Yet the requirement frequently made in examinations that a candidate must identify a number of chemical and pharmaceutical specimens—in one case within the writer's knowledge, as many as seventy-five in a single examination—partakes of the same nature as the recognition of acquaintances by name. The writer well remembers being unable to connect paregoric with its proper appellation under such circumstances, and being roundly laughed at therefor by a jovial and sympathetic examiner. Would it detract from the value of such a test if the candidate were handed a list which included the specimens at hand together with others, and he be required to pick out the specimens submitted by aid of the list? Would it not rather increase the value of the test by eliminating the most uncertain factor which it includes?

In examinations for registration or for special positions, it is particularly desirable to reduce the tax upon the memory to a minimum. The fact that the subjects and scope of the examination are announced in advance, and opportunity is thereby given to the candidate to refresh his memory, partly justifies a strong requirement in this regard; but such examinations are frequently taken by those whose memory is on the wane, and who find it very difficult, if not impossible, to secure the time and facilities for renewing study. Yet these may excel in judgment and capacity for meeting the scientific as well as the business demands of pharmacy, and it is desirable that the examination should educe their capabilities.

Our schools have less of a demand in this direction, and yet I venture to say that it would be a long stride forward in education, and one which would greatly benefit the cause, could our colleges so frame and conduct examinations as to eliminate from the students' minds the impression that the chief purpose of an education is the training and development of the memory.

It would not be very difficult, for instance, in an examination in chemistry, to so frame questions that the candidate, with free access to a text-book and the privilege of refreshing his memory during the examination, would be forced to show his command of the principles of chemistry and their common applications, with no uncertainty. An occasional administration of this method might be of much benefit to both the student and the examiner, though its constant practice would be likely to lead to worse evils than it is designed to cure.

Yet the writer desires to testify that in examining students in advanced pharmacy, the Pharmacopœia being the subject directly taught and the text-book used, I have found it profitable and advantageous to allow of the free use of the Pharmacopœia in the examinations. In these the student was required to demonstrate his comprehension of the language, the processes and the point of view of the Pharmacopœia, and to offer sound and reasonable criticisms thereon. The impression made upon the students themselves appears to be salutary, and it has received their endorsement, not, I think, from any impulse of laziness, for some have confessed that they find these examinations more trying than those in which they can claim the benefit of the uncertainties of memory.

But if the use of text-books in an examination is not considered desirable, there is yet opportunity in the phrasing of questions and the offering of correlated facts to reduce materially the tax upon the memory.

One other factor deserves consideration. Modern methods of education demand very strongly laboratory work and practical exercises. If laboratory practice is desirable, an examination upon manual dexterity is also of value. This is generally objected to on the ground of lack of time and facilities, yet something can be accomplished with a minimum of both. One does not have to watch a skilled workman through an entire operation to learn whether he has a command of his trade or not. His skill is shown in the grace and rapidity of all his motions, in the readiness with which he goes about his work, and that deftness which results in the saving as well as the accomplishment of work.

The writer asks to be pardoned for again referring to a personal experience which illustrates what a single brief operation may indicate. In an examination on metrology each student was called individually to the desk, and when screened from the rest of the class was asked to measure out an ounce and a half of water into the graduate before him, from a labeled bottle. The proper methods had been illustrated before the

class, and all of the candidates had had abundant opportunity to practice them, yet the awkwardness, inaccuracies and wastefulness exhibited in many instances was a startling revelation. As an indication of the personal habits, attitude and carefulness of the individuals, it was far better than words.

There are many operations in chemical, botanical and pharmaceutical technique which require but a moment's time and but little apparatus or material, which may be made to serve, as straws show the wind, to indicate the candidate's habits and training. Close observation by the examiner on minor and simple operations will reveal much to him, and while more lengthy and repeated operations are desirable where circumstances permit, the small trials can be made to help much. The possibilities in this line are almost as limitless in one direction as in another, and there is no teaching or examining institution in this country which cannot, if it desires, do something in this direction. The more simple and common the operation, the greater will be its value in an examination.

This paper is not intended as a complete discussion of the subject. There are many phases of the question, and but one is herein considered. The curriculum, the language, the marking, the physical methods of conducting, the scope of examinations, and other themes of like character are all important. These have been ably treated by others, and there is yet room for consideration.

The purpose here has been to present a few thoughts concerning the personal element, which is just as truly a part of the subject; and here is intended not the individual qualities, but those inherent imperfections in human nature which are common to us all, and which mark both our opportunities and our limitations. It would seem that a frank acknowledgment of these qualities may lead not only to the avoidance of certain errors, but to the discovery of new methods and a higher degree of justice.

Boston, Mass., August 1, 1899.

On motion, the Section adjourned.

After adjournment the Chairman announced that Messrs. Alpers, Lloyd and Stedem had been selected by himself and the Secretary as associate members of the Committee on Pharmaceutical Education and Legislation.

ENTERTAINMENTS AT THE FORTY-SEVENTH ANNUAL MEETING.

The gathering of members of the Association and their families and friends at Put-in-Bay, on South Bass Island, Lake Erie, far from the din and excitement of large cities, afforded a most excellent opportunity for the enjoyment of wholesome rest of both mind and body. The beautiful location of the island offers a diversity of sport and entertainment which was eagerly sought by those present, while the commodious and well-appointed hotel, with its ample verandas, was admirably adapted for delightful social intercourse during the evening hours; to all this must be added the satisfaction and comfort derived from a well conducted kitchen and courteous service. A timely and important announcement was made by Prof. Lloyd in his address of welcome on behalf of the Ohio State Pharmaceutical Association, in calling attention to Nature's wonderful work of providing interesting caves and numerous glacier markings on the several islands comprised within the group of which South Bass Island is the largest, so that all so inclined might inspect these and be instructed. The Crystal Cave at Put-in-Bay, discovered in 1897 and owned by a German resident of the island, Gustavus Heinemann, proved especially attractive on account of the beautiful masses of large prismatic crystals of strontium sulphate, supported on beds of limestone. The cave was uncovered while drilling for water, and the character of the large deposits of crystals makes it appear probable that at some time, ages ago, a solution of strontium sulphate slowly percolated through the limestone formation, gradually forming a pool of saturated solution, from which, by the slow evaporation of water, crystals began to form and grow to large size under the most favorable conditions. Some crystals 6 to 8 inches in length and from 2 to 3 inches in thickness were observed.

On Monday evening, September 4, a reception was tendered the visiting members by the Ohio pharmacists in the convention hall of Hotel Victory, which was largely attended and especially enjoyed by the younger element, for whose benefit select dance music was provided. Cooling refreshments were served.

For Wednesday evening a special entertainment had been arranged, at which the visitors were treated to selections of vocal music by Miss Olinda Voss and Mrs. Joseph Feil, both of Cleveland, O., and readings by Prof. Lloyd from an unpublished manuscript, forming part of The Dead Chemist Series, wherein the author pictured with striking reality the condition of a Kentucky sand-pike on a hot summer day, as also the char-

acteristics of Kentucky life. The pathetic description of the mountaineers' feud and the narrative of Sam Hill's mother-in-law and her final death and entombment were particularly enjoyable.

The chief social event of the week was the excursion to Cleveland on Thursday, September 7, participated in by nearly all the visiting members and their friends. The steamer City of the Straits had been chartered for the purpose and left Put-in-Bay at eight o'clock a. m., arriving at the government dock at Cleveland about half-past eleven. Here carriages were in waiting to convey the party on a twenty-mile drive through the principal thoroughfares and parks of the city, visiting Garfield's beautiful Memorial Tomb on the way, and returning in time for a sumptuous dinner at the Hollenden Hotel. After strolling about the near-by stores and streets for some time, the party started on the return trip about seven o'clock, and reached the hotel at Put-in-Bay just in time to escape a severe wind and rain storm, which had followed in the path of the steamer and struck the building about eleven o'clock. The entertainment on Thursday was given by the Cleveland pharmacists and their friends of the State Association, who were indefatigable in their efforts to insure for every one a full measure of comfort and pleasure, in which they succeeded admirably, and special acknowledgment should be made to the committee in charge, consisting of Messrs. Hopp, Voss, Hannan, Selzer, Hechler, Haake, Schellentrager, Lehr, Stecher, and others, for their untiring attention.

After adjournment of the business sessions, a party of nearly ninety ladies and gentlemen accepted an invitation from the firm of Parke, Davis & Co., of Detroit, Mich., tendered through the firm's popular representative, Mr. Joseph Helfman, to inspect their extensive establishment at Detroit, and to become the guests of the house during their stay in the city. Leaving Put-in-Bay at half-past three p. m. on Sunday, Sept. 10, on board the steamer Frank E. Kirby, Detroit was reached about seven o'clock, and the whole party comfortably quartered at the Russell House. Early on Monday morning the visitors were taken in special trolley-cars to the well-known laboratories of the firm, where they were welcomed by Messrs. Warren and Wetzel, General Manager and Vice-President respectively of the corporation. Under the guidance of a number of employees of the house, especially selected for the purpose on account of their familiarity with the various manufacturing processes and details of the different departments, the party were next conducted through the commodious buildings and shown everything that might possibly be of interest, from the stock-rooms of crude drugs and fine chemicals to the assay departments for finished products, and the biological and physiological laboratories. To say that the visitors were highly gratified and instructed is to give but a mild expression to the feeling of pleasure and satisfaction

derived from the opportunity for inspection so generously placed at their disposal by the management of the firm. Among the items of special interest was the biological department, with its several sub-divisions, where the hypodermatic injection of toxin into one horse, and the withdrawal of blood for antitoxic serum from the jugular vein of another animal, were carried out in the presence of the visitors. An alarm of fire having been sounded, those present had an opportunity of witnessing a most effective system of fire drill, showing how quickly, in case of need, most valuable service can be rendered by the employees with chemical extinguishers and numerous hose attachments, under command of their chief, Mr. L. F. Fink. The spectacle of five or six large streams of water playing upon different parts of the building in less than two minutes after sounding the alarm of fire impressed the visitors most favorably as to the completeness of arrangements for controlling one of the worst accidents that can befall large manufacturing establishments. To attempt to give a detailed account of the many unique appliances in use in the various departments would require too much space and time, and the writer can but say that all who were prevented from joining in this most enjoyable and instructive visit, missed a most valuable lesson. Luncheon was served under a large tent in the court yard, and in the afternoon numerous tally-ho coaches and other carriages were provided to carry the visiting party through the leading thoroughfares, for inspection of the beautiful clean streets of Detroit, and its fine public and private buildings, after which the drive was continued to Belle Isle Park, justly the pride of all Detroiters, along the banks of the river and through beautiful groves, returning to the hotel about seven o'clock.

This visit to Parke, Davis & Co.'s establishment will long dwell in the memory of those who participated, and with grateful pleasure do we recall the kind attentions and services of Messrs. Helfman, Fink, Perkins, Parker, Layson, Palmer, Diehl and Elbrecht, as well as of Drs. Houghton, Aldridge and Francis.

Before leaving Detroit appropriate resolutions of thanks to the firm of Parke, Davis & Co., its popular manager and corps of employees, were adopted in the parlors of the Russell House and presented to the firm's staff present, on whose behalf Mr. Helfman responded in happy, well chosen phrases.

C. C., Jr.

REPORT ON ENTERTAINMENTS AT THE FORTY-SIXTH ANNUAL MEETING, HELD AT BALTIMORE, MD., SEPTEMBER, 1898.

BY C. LEWIS DIEHL.

To the Council of the American Pharmaceutical Association:

If we scan the minutes of the meetings of our Association that have been held before 1898, we will invariably find somewhere, usually as an appendix, some account of the entertainments in which the members participated during these meetings. We look in vain, however, for any such reference in the minutes of the meeting of 1898, and one not better informed might naturally conclude that this meeting, held at Baltimore, enjoyed the unenviable distinction of having been held without the provision of social entertainment, or the tender of social courtesies by the local friends of the Association; whereas, it is a well understood fact that the entertainments given at Baltimore were among the most enjoyable, and the social courtesies extended among the most hospitable and profuse in the experience of the Association.

Charged with the duty of giving an account of these entertainments, your Committee vainly searched for the cause of this omission, and can find no explanation, unless it be that the efforts, in their official capacity, of the officers charged with the duty of providing entertainments, were so far outranked by their efforts as individual Baltimoreans, that they feared a truthful account of them might be construed as self-laudatory of some of the principal officers of the Association. However this may be, it remains a fact that the pleasure and success of the entertainments given at the Baltimore meeting, while largely due to the tact and energy displayed by the members officially charged with that duty, were possible only by the active assistance and solicitude of the Baltimore pharmacists in general, and their ladies in particular.

In making arrangements for the meeting, every detail that could add to the comfort of the visiting members appeared to have been carefully considered. The place of meeting selected was commodious, tastefully adorned with growing plants and festoons, easily accessible by street railways, and amply provided with all conveniences to expedite the business of the Association by the Local Secretary, Mr. H. P. Hynson, and his efficient associates. To promote the personal comfort of the members there were spacious retiring rooms in which they might not alone find rest and hold friendly converse, but could also appease the cravings of

hunger and of thirst, with the bountiful supply of tempting viands and cooling beverages, provided during the entire time of the sessions—the ladies enjoying the additional privilege of listening to the strains of an excellent orchestra in the apartment in which they were served. Truly it may be said of our Baltimore friends that they kept open house for their visitors, and that with them, as might be expected on the threshold of the South, the latch string was on the outside and the door never locked. The only one thing that marred the pleasure of the visitors was one for which the hospitable Baltimoreans could not be held responsible—"the heat;" for it was hot in Baltimore, and even Professor Simon failed to temper it with liquid air.

The formal entertainments began with a reception tendered by the local pharmacists to visiting members of the Association and their friends. This included vocal and instrumental music and recitations by local talent of high order. Miss Alma Dohme sang two arias from "Der Freischütz," and several pretty songs were rendered by a quartette composed of the Misses Cummings and Nicolai, and Messrs. Harry Smith and F. W. Weber, while Mr. Oldham contributed to the hilarity of the occasion by his admirable recitations in German and Negro dialect. After the close of the official programme, which embraced some delightful instrumental music by the orchestra, an elegant collation was served, and then—well, then the younger folks tripped the light fantastic until—well, until some time before sunrise.

The following afternoon was devoted to a carriage ride through "Druid Hill Park," which is by many considered one of the most beautiful natural parks in the world, taking in *en route*, both going and returning, some of the most interesting parts of the city. A few of the visitors, unfortunate in being late, failed to participate in this delightful drive; but it was not in the program of their hosts that they should be deprived of seeing to advantage the park, to which, with justice, the citizens of Baltimore point with so much pride, and ample opportunities were provided on succeeding days for those who had been unavoidably disappointed on this.

Wednesday was a holiday, so to speak. Promptly at 12 o'clock the members and excursionists assembled at Pier No. 10, whence, on a commodious steamer, the start was made with little delay for a visit to the ancient town of Annapolis, the Naval Academy, and the Old State House. Notwithstanding that the heat was at times somewhat oppressive, the sail was delightful—past historic Fort McHenry, inspired by the strains of the "Star Spangled Banner," the steamer feeling its way through innumerable fishing smacks, oyster boats, vessels towed by puffing giants, large and small crafts of every description, into and down the beautiful Chesapeake Bay. And so Annapolis was reached in good time with more comfort than was anticipated on starting. En-route a bounteous collation was served, and the indefagitable hosts and hostesses—particularly the latter—

saw to it that every one was well provided, so that on arrival at Annapolis the excursionists were in the best possible humor and in good condition for the arduous labor of sight-seeing. The presence of Spanish officers as prisoners of war at the Naval Academy unfortunately interfered with part of the program of this trip; for, owing to the stringent regulations in force, the Academy grounds were not open to visitors. The excursionists therefore contented themselves with a visit to the Old State House, the scene of the resignation by General Washington of his commission as Commander of the Continental Army, and in wandering through the quaint streets of the town, in the course of which Admiral Cervera was besieged and for a short period captured for the second time, not by the army or naval forces of the United States, but by a far more potent force—the ladies of the Association. His gallantry was such, however, that the ladies, after sundry bribes in the way of autographs, agreed to give him an opportunity to retreat with the honors of war, which he did amid the cheers and good wishes of his whilom besiegers. Then the return to the steamer, a general settling into groups according to affinity or selection, some for conversation, others for contemplation, and the younger element to engage in the delights of the dance and its opportunities for flirtation. And so, after a delightful ride, home, to sweltering Baltimore.

Thursday night was in many respects the gala night of the meeting. From 8 to 10 o'clock the visitors were entertained by a masterly lecture and exhibition of the properties of liquid air by Prof. Wm. Simon—on something every one had heard about, but few had become acquainted with. Most of those present had an opportunity for the first time to see liquefied air, and they had ocular demonstration of its physical properties and possibilities, which were familiar in description only to the minority of the lecturer's audience. The freezing of mercury into a solid is a comparatively familiar experiment; but when the cold produced by the agency of liquid air becomes so intense as to freeze it to a condition in which it is as hard as steel, a bar of that metal becomes so resistant as to bear in suspension many times its own weight; when alcohol is frozen into crystals; ice into a condition in which it crumbles into powder; a fresh egg becomes as solid and brittle as glass; a soft rubber ball may be broken into brittle fragments; a kettle containing liquid air and heated by direct flame accumulates ice and snow on its under surface! we realize that we have witnessed phenomena, the possibilities of which were not dreamed of a few years ago, and which, but for the fact that they have been produced before our eyes, we might find difficult to believe possible. Prof. Simon's lecture was in fact a revelation which entitled him to the enduring thanks of his audience.

After the lecture the visitors enjoyed the privilege of paying their personal respects to Mr. and Mrs. Charles E. Dohme and their charming daughters, the Misses Adele and Alma Dohme, who, though by no means

strangers, had on this occasion specially endeared themselves by unremitting attention and innumerable acts of courtesy to the visiting ladies, and who, throughout the meeting, seemed to be omnipresent at all functions, and where and whenever a helping hand was needed by the strangers. Mrs. Dohme and her daughters were assisted in receiving by Miss Clara Adt and Miss Minna Weilbacher, the occasion being enlivened by the music of an orchestra during the hours of the reception. It goes without saying that the visitors were impressed with the cordial welcome of their hosts, which was informal, and therefore the more enjoyable. It is needless also to add that there was no lack of cooling ices and beverages, which were enjoyed all the more because of the extreme heat experienced during Prof. Simon's interesting lecture.

The entertainments, in so far as the initiative came from the local pharmacists, were concluded on Friday night by a trolley car ride to the Electric Park, where the visitors were entertained by a vaudeville performance, refreshments and fireworks, especially provided for the occasion.

As indicative of the good cheer that was provided at all the functions at which substantial refreshments were served, the badge prepared for the visitors may serve as a token. On it were represented the four staple luxuries of Baltimore, viz: the oyster, the crab, the diamond-back terrapin and the canvas-back duck; and while the latter was probably not supplied, being out of season, the visitors had abundant opportunity to enjoy the others to their hearts' content. Suffice it to say, nothing was left undone that could add to the enjoyment or personal comfort of the visitors, either singly or as a body; not the least of which was the constant attendance of a caterer with a supply of solid and liquid refreshments, as initially mentioned, to whose presence must be attributed the uniformly good attendance of the members during the sessions, and the consequent dispatch of business.

Though not strictly coming within the province of a report on social entertainments, your Committee cannot refrain from mentioning the remarkable exhibition of live indigenous medicinal plants and of crude drugs made specially for this meeting by Messrs. Muth Bros. and Co., of East Fayette street, which attracted much attention, and, in its way, served an excellent purpose as an entertainment. Many of the members were attracted to this exhibition, which was generally conceded to possess great educational value, and to be worthy of emulation on similar occasions.

On the official program at this meeting there were several entertainments, indicated as social features to follow the adjournment of the business session. These were excursions to Ocean City; to the Blue Ridge, and the Gettysburg battle-field; and to Washington and Mount Vernon. The excursion to Ocean City was well attended, but most of the visitors preferred to rest on Sunday after the week's fatigue, and to pre-

pare for the excursion on Monday, to which they all looked forward with much pleasure. The party numbering about two hundred, chaperoned by Mr. Hynson, left Baltimore on a special train over the Western Maryland Railroad at 8:30 Monday morning. Passing through a beautiful agricultural country, Gettysburg was reached about 10:30, where the party under the escort of competent guides was conveyed in trolley cars and carriages to the battle-field, visiting the important points and recalling, some from actual experience, others from historical knowledge, one of the most sanguinary conflicts of the war for the maintenance of the Union. After a sumptuous dinner, the journey was continued over the road of the Western Maryland, soon ascending by a circuitous route the eastern slope of the Blue Ridge, amid most magnificent scenery. An hour's ride brought the party to Pen-Mar, on the very top of the mountain range, overlooking the charming and expansive valley in which nestled the little city of Waynesboro. Here the party scattered, and, refreshed by the delightful temperature at this high elevation, wandered about the beautiful grounds surrounding this noted resort, or took short drives to various points of interest near-by. After an ample supper the train was again boarded, and Baltimore reached at about 10 o'clock, with the pleasant recollection of another day well spent.

Early Tuesday morning found the excursionists, rendered indefatigable by the precepts of their hosts, speeding their way over the B. & O. R. R. towards the Capitol of the Nation, where they were received by a delegation of the pharmacists of Washington and escorted to the steamer for a pilgrimage to Mount Vernon. With their number largely augmented by their Washington hosts, the party experienced a delightful trip down the historic Potomac. Fanned by refreshing breezes the steamer glided gently down the stream, the majestic dome of the Capitol and the tall Monument in sight long after the other prominent buildings of the American metropolis had faded from view; past ancient Alexandria, and so down until admonished of the approach of their journey's end by the mournful toll of the steamer's bell. To many of the party this trip was not new; but to those that made it for the first time the visit to the erstwhile home of the most illustrious son born on American soil, affectionately known as the Father of his Country, and to the abode that encompasses his mortal remains, was an occasion of solemnity, and in every sense a pilgrimage.

Returning to the city after a brief stay, the visitors were reminded that however efficiently their Baltimore hosts had contrived to comfort and entertain them, "there were others" who needed but the opportunity to practically demonstrate their ability and pleasure to give entertainment. A sumptuous banquet was provided in the spacious dining-room of the Metropolitan Hotel, under the auspices of the pharmaceutical fraternity of Washington, which was accepted both as a token of the fraternal feeling between the two neighboring cities, and as a fitting close to the long cycle

of festivities; giving the opportunity, missed at the previous functions, of expressing the kindly feeling that actuated the generous hosts, and of the sense of gratification felt by their guests, in speeches by Messrs. Wm. S. Thompson, Charles E. Dohme, Henry P. Hynson, Henry M. Whelpley, Miss Josie Wanous and others.

REPORT

ON THE

PROGRESS OF PHARMACY.

From July 1, 1898, to June 30, 1899.

By C. Lewis Diehl.

With the increase in the volume of the Proceedings, it has become necessary to devise ways whereby this Report might be abbreviated without material interference with the subjects that are of practical value to the pharmaceutical profession. In the present Report, therefore, the "Introductory," which during the past several years has taken up considerable space, has been omitted. It has been endeavored, also, to make the abstract of papers as terse and compact as their importance seemed to justify, and to exercise a more careful discrimination in the selection of subjects to be embodied in it from among the mass of available matter that has appeared in the current literature. While, therefore, the report will probably be found to embody the usual number of references, they will be characterized by greater brevity than has heretofore been the practice. The reporter has, however, not hesitated to enter into greater detail whenever the importance of the subject under consideration seemed to demand or justify such a course.

As in previous reports, a brief review of the work done by the State Pharmaceutical Associations during the past year has been compiled for this, and is appended to this Report. It is to be regretted, however, that the response of the State Associations to the request that their Proceedings be supplied for this purpose is no greater than heretofore, the number received being but a bare majority of all the Associations, and unless a more complete series of these Proceedings can be received hereafter, it seems best to omit the review in future reports.

PHARMACY.

General Subjects.

British Pharmacopœia—Various Criticisms.—In his address to the British Pharmaceutical Conference, the president, Dr. Symes, reiterates the oft-repeated objection to the constitution of the British Pharmacopœia Committee of the General Medical Council, protesting against the exclusion of pharmacists from that body when the bulk of the work of revision must of necessity be done by pharmacists.

In the opinion of Mr. Peter MacEwen the British Pharmaceutical Conference should take upon itself the task of revising the Pharmacopœia. The formulary committee should be reorganized so as to be representative of the more important centers in the three kingdoms, preferably through local pharmaceutical associations; of the Pharmaceutical Societies of Great Britain and Ireland, and of every pharmaceutical association and society in India, Canada and the colonies. This General Committee should appoint a smaller working committee, which should secure the co-operation of the Pharmaceutical Research Laboratory, and of any similar institution at home and abroad. Pharmacists would thus take the lead in the matter of pharmacopœia revision, and might stipulate for more satisfactory conditions than now prevail when asked by the General Medical Council for assistance.

In the opinion of P. Kelly not only should the Pharmacopœia be regarded as a text-book, but it should be a work that can be looked upon as a standard both in scientific work and in manufacturing operations. Change in atomic and molecular weights, the introduction into the British Pharmacopœia of standard and constitutional formulæ, alterations in nomenclature, modification of texts, and the standardization of preparations of patent drugs, are commented upon by the author, who finds the British Pharmacopœia, 1898, an improvement on its predecessors, particularly as regards chemistry, and in line and harmony with his ideas of greater utility.

F. C. J. Bird expresses himself generally favorably upon the galenical formulæ of the British Pharmacopœia, 1890, and conveys in a very interesting paper a general idea of the influence which they have had upon the work of the manufacturing laboratory. H. W. Gadd, on the other hand, regards the weakest point of the galenical pharmacy of the new British Pharmacopœia to be in the processes, and asks the pertinent question whether in some future revision pharmacopœial processes may not properly be omitted and texts extended.

Remedies that should be protected from light.—A German official reviser of pharmacies communicates the following list of remedies which should be, but usually are not, protected from light:

Acid. Gallicum.
Aristol.
Cinchonidine Sulphate.
Ferr. Albuminat. sicc. et Ammon.
Ferr. Citras.
Ferr. Citras effervesc.
Ferr. Peptonatum.
Ferr. Phosphas.
Ferr. Pyrophos.
Ferri Pyrophos. c. Ammon. Citr.
Ferri. et Potass. Tart.
Guaiacol.
Iodum Trichloratum.
Liq. Hydrarg. peptonati.
Liq. Hydrarg. albuminati.
Liq. Ferr. pepton. c. Mang.
Liq. Ferr. Sacch. c. Mang.
Hydrogenium peroxid.
Tinct. et Syrup. Croci.

—Apoth. Zeit., Feb. 15, 1899, 84.

Solubility of Various Remedial Substances in Different Solvents—Correction of Pharmacopœial Statements.—Henrik Enell, in a paper read at the Northern (Scandinavian) Apothecaries' Conference, criticises the variable and inaccurate statements found in the different pharmacopœias respecting certain remedial substances, and communicates the results of his own determinations for comparison. These are given in the following table, the pharmacopœial solubilities being omitted:

SOLUBILITY OF 1 PART IN

	Water at 15° C.	Boiling Water.	Alcohol 91 per cent.	Ether, sp. gr. 0.720–0.721.	Chloroform.	Glycerin.
Acetanilid	230.	22.	3.5	26.	—	6.
Acid boric	—	—	22.	—	—	—
Ammon. chlor.	2.28	1.2 when boiling. 1.5 at 100° C.	45.	—	—	—
Antipyrine	—	—	—	75.	50.	—
Apomorph. hydrochlor.	55.	—	40.	—	—	—
Codeine	115.	not less than 50.	a little less than 5.	about 50.	—	—
Caffeine	75.	somewhat less than 2.	50.	—	betw. 9 and 10.	—
Hydrarg. bichlor.	16.	2.5	a little less than 3.	16.	—	a little less than 10.
Hydrarg. biniodid.	—	—	135.–140.	190.–200.	—	—
Iodoform	—	—	—	a little less than 6.	—	—
Kalium chloricum	between 16.5 and 17.	2.	—	—	—	—
Kalium bitartar.	190.	somewhat less than 20.	—	—	—	—
Lithium carb.	98.63	—	—	—	—	—
Morph. hydrochlor.	a little less than 20.	—	more than 45, less than 50.	—	—	—
Natrium bicarb.	11.	—	—	—	—	—
Natrium acet.	1.	—	21.	—	—	—
Natrium carbon.	1.6	—	—	—	—	—

These figures vary in some cases very materially from the pharmacopœial statements.—Apoth. Ztg. Sept. 7, 1898, 629; from Meddelanden fran. Farmaceutiska Förenigen, 1898, 1–4.

Medicinal Drops—Relation to Weight.—Prof. Harnack has made a study of the influence exerted by certain substances in solution upon the size, and consequently weight, of drops. As a practical outcome of his studies, the following determination of the number of drops required to make the weight of *one gramme*, under as nearly as possible identical conditions, may serve a good purpose for comparison and reference:

One gramme of

Acetum	16 drops.	Ol. Menth. Pip	30 drops.
Acid. Acetic. dil	23 "	Ol. Olivarum	28 "
Acid. Carbol. liq	23 "	Ol. Sinapis	28 "
Acid. Hydrochloric. dil	12 "	Ol. Terebinth. rect	34 "
Acid. Sulphuric. dil	12 "	Paraldehyde	36 "
Alcohol	42 "	Spiritus	40 "
Amylen hydrate	40 "	Spir. Dilutus	35 "
Amyl Nitrite	37 "	Spir. Aethereus	41 "
Aqua Destil	13 "	Spir. Aether. Nitros	37 "
Aqua Amygd. Am	25 "	Spir. Camphor	33 "
Aqua Chlorata	13 "	Tinct. Cinchonæ	35 "
Formaldehyde, Solut	24 "	Tinct. Cinchonæ Comp	35 "
Kreosotum	25 "	Tinct. Colchici	34 "
Liq. Ammon. Anis	36 "	Tinct. Ferri Acet. Aeth	34 "
Liq. Ammon. Caust	14 "	Tinct. Ferri Chlor. Aeth	41 "
Liq. Ferri Sesquichlor	11 "	Tinct. Ferri Pomati	18 "
Liq. Potass. Arsen.	21 "	Tinct. Iodi	39 "
Liq. Plumbi Subac	13 "	Tinct. Opii Crocata	28 "
Mixt. Sulphur. Acid	33 "	Tinct. Opii Simplex	28 "
Ol. Amygd. Express	28 "	Tinct. Strophanthi	34 "
Ol. Anisi	27 "	Tinct. Strychni (Nux Vom.)	34 "
Ol. Carvi	31 "	Tinct. Valerianæ	34 "
Ol. Caryophyll	27 "	Tinct. Valerianæ Aether	41 "
Ol. Croton Tiglii	29 "	Vina Medicata, about	23 "

Pharm. Ztg. 1899, 175.

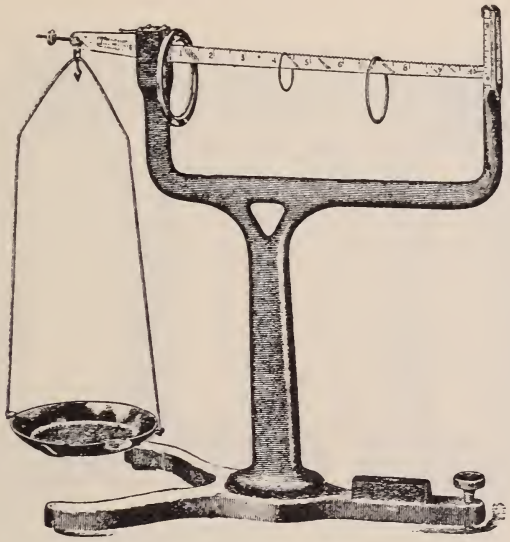
Apparatus and Manipulations.

British Apothecaries' Weights—Prohibition in the Pharmacies of Naples.—Consul Neville-Rolfe reports a singular case from Naples, in which the British weights in a pharmacy in which a specialty was made of English prescriptions, were forcibly seized by the police—presumably because the use of weights other than the metric is illegal. If this police regulation should be maintained, it becomes necessary in filling such prescriptions in Naples to reduce the denomination of British to metric weights, a very troublesome task under any conditions, but particularly so in the case of very small quantities. Thus, to weigh one English grain, equal to 0.0648 metric gramme, five weights are required. The regulation must lead to

gross mistakes in dispensing, and it is clear that pharmacists should be exempted from any general law requiring the exclusive use of metric weights.—Pharm. Jour., March 4, 1899, 214, g.

Balance—Useful Construction for Students.—C. E. Linebarger describes the balance shown (Fig. 1), which is designed for the use of students in

FIG. 1.

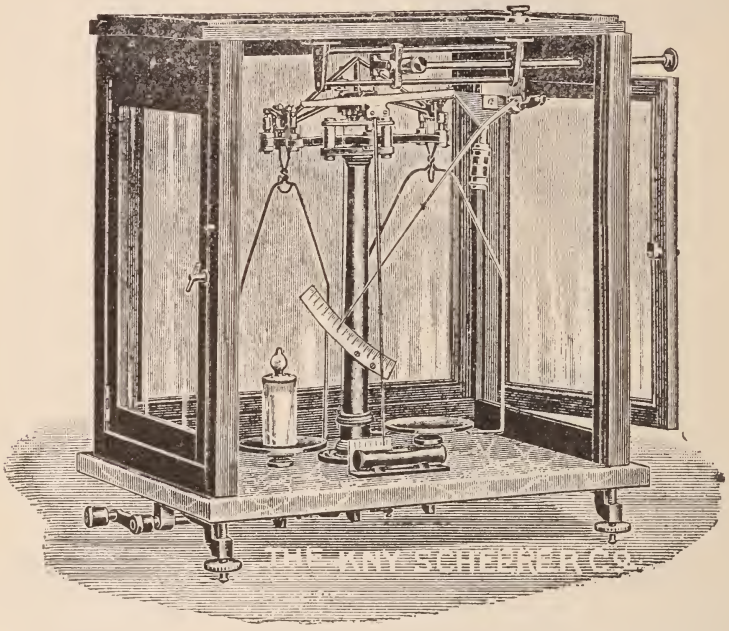


Balance.

courses of elementary chemistry, and which, owing to its special construction, prevents the loss of weights—an evil which is of common experience. The balance has unequal arms, their ratio being 4 : 1. The longer arm is 20 Cm. long, and is divided into 100 equal parts, notches being made at each division. The weights consist of three riders, weighing respectively 25, 2.5 and 0.25 Gm. In weighing, the positions they occupy, when equilibrium is established, show at a glance the proper weight. Thus, the reading shown in the cut is .742 Gm. The riders have a ring-shape, so that they form an integral part of the balance, and cannot be lost. When any of them are not needed, they may be placed on a horizontal arm above the beam, and are then out of the way. Their sizes are such that they easily slip through one another. The capacity of the balance is 111 Gm.; and it is sensible to 0.005 Gm. without a load, and to about 0.01 Gm. with an average load. The up-and-down motion of the pan is so slight, and the lateral motion of the beam so limited by stops, that but little damage can be done to the steel knife-edges, even though a careless student might carelessly throw the object to be weighed on the pan. To prevent corrosion as much as possible, most of the parts are lacquered.—Merck's Rep., May, 1899, 217; from Jour. Amer. Chem. Soc., xxi, 31.

A New Chemical Balance—Advantages, etc.—R. Hase describes a new chemical balance, shown by the accompanying cut (Fig. 2), which has an arrangement for rapidly determining the approximate weight of the body to be weighed. This arrangement consists of a system of levers which can be put into use by turning the knob on the top of the case. This lever system bears on the hanging and beam of the balance, and when the bal-

Fig. 2.



Chemical Balance.

ance beam is released, a pointer on the lever system indicates on a scale the weight of the body within a centigram or two. The weights indicated on the scale are then put upon the right-hand pan, the pointer on the scale always indicating the amounts of weight yet to be added. The lever system is then turned aside by means of the knob on the top of the case and the finer weighings made as with an ordinary balance. With a little practice the weighings can be so made that after putting on the weights indicated by the lever, it will be only necessary to use the rider arrangement.

The balance is particularly useful for weighing out definite amounts of material. The substance can be weighed out without checking the balance while making each addition, as is necessary with the ordinary balance, and can be added until the pointer on the scale indicates the desired amount. In view of the fact that an ordinary analytical balance must be checked a great many times while making a weighing, it is evident that the balance is greatly saved from wear by this arrange-

ment, and the time saved in making a weighing is certainly a decided advantage.—Pharm. Review, Feb., 1899, 70; fr. Ztschr. f. angew. Chem., 1898, 736.

Specific Gravity—Convenient Method for Light Solids.—T. S. Wiegand calls attention to a convenient method of taking the specific gravity of substances lighter than water, which though published in a recent treatise on pharmacy as having been devised by Mr. Symond, London, England, in 1884, was fully explained by the late Dr. Robert Hare, and published in his treatise upon chemical philosophy in 1828. The method is so convenient that it will bear repetition here. It consists in suspending a glass funnel to a scale pan by the stem, immersing it completely in water, adjusting equilibrium, and then thrusting the body beneath the funnel. The weight necessary to again adjust the equilibrium, added to the weight of the body in air, gives the weight of a volume of water equal to that of the light body, and its specific gravity is then calculated in the usual way.—Amer. Jour. Pharm., Jan. 1889, 26.

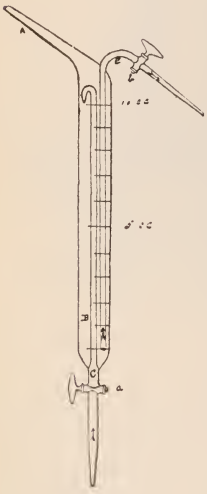
Hydrometers of Total Immersion—Advantages and Superior Accuracy.—A. W. Warrington has made a series of experiments, with the object of showing that the hydrometer becomes an instrument of scientific precision if it is modified so that when used it is totally immersed in the liquid. Small ring-shaped platinum weights are slipped over the ungraduated neck of a glass hydrometer until the latter has nearly attained the specific gravity of the liquid to be tested. The temperature of the liquid is then slowly altered until the hydrometer and the liquid have exactly the same specific gravity. With proper precautions this method gives results accurate to one in a million for temperature from 0° to 40° C. To determine the specific gravity of a solid, use is made of a glass hydrometer of total immersion, which in form is not unlike a Nicholson hydrometer which has lost its tray. Two experiments are made at approximately the same temperature; in one of which the hydrometer is weighted only with pure mercury, and in the other it is weighted with the solid, together with the necessary amount of mercury. As in the determination of the specific gravity of a liquid, the temperature is determined at which the hydrometer has no weight in water. The results are accurate to one in a hundred thousand.—Chem. News, Sept. 16, 1898, 144.

Volumenometer—Simple Construction.—C. E. Linebarger describes an apparatus for the determination of volume, which is readily constructed with pieces of apparatus usually found in laboratories, is easily manipulated, and yields accurate results. A w. m. two-ounce bottle is filled with a bi-perforated stopper. A 10 Cc. pipette, graduated to $\frac{1}{10}$ Cc. and permitting the determination of $\frac{1}{100}$ Cc., is introduced through one of the holes, a funnel tube with a short stem, bearing a mark just below the widened part, through the other so that the end of the stem may be flush with the inner surface of the stopper, thus permitting the bottle to be com-

pletely filled without imprisoning any air bubbles. A long piece of rubber tubing is attached to the upper end of the pipette and provided with a good pinch-cock. The apparatus is then filled with the liquid to a little above the mark in the stem of the funnel, avoiding all air bubbles, and suction is applied to the extremity of the rubber tube, so as to bring the level of the liquid in the funnel stem to the mark, after which the pinch-cock is closed. The position of the liquid in the pipette having been noted to $\frac{1}{100}$ Cc., a weighed amount of the solid under examination is placed into the funnel, and, having removed the pinch-cock, the liquid is gently blown up and down until the solid is completely washed into the bottle. The liquid is then once more adjusted to the mark in the funnel, and the new position of the liquid in the pipette read off.—Journ. Amer. Chem. Soc., 21, 435.

Pipette—A New Form.—The accompanying cut, Fig. 3, illustrates a new pipette for drawing off definite volumes of liquid as designed by John Forbing, a student of an advanced chemistry class of the Ohio Normal University. The apparatus is constructed entirely of glass, and is graduated in divisions of cubic centimeters, and the method of using it can be comprehended at a glance. *A* is a glass mouthpiece by means of which the liquid is drawn into tube *B* through *C*, and which also serves to expel the liquid through *E* after the stop-cock *a* is closed. The stop-cock *b* should be closed when the liquid is drawn into the graduated tube. The pipette is particularly adapted for use with poisonous or corrosive liquids, as it avoids the danger of such liquids coming in contact with the mouth. —Amer. Drugg., Sept. 10, 1898, 161.

Fig. 3.



Pipette.

Cooling Pipette—Use for Withdrawing Hot Fluids.—Friedrichs describes a cooling pipette, shown by Fig. 4, which is intended for the withdrawal of hot fluids from one vessel and transfer of the same to another without danger of cracking the latter. In its passage through the twisted portion of the stem the liquid is cooled sufficiently to prevent the cracking of glass funnels or other utensils into which it may have to be transferred for filtration, examination, or other purposes that may arise during various chemical operations.—Pharm. Ztg., Oct. 12, 1898, 733.

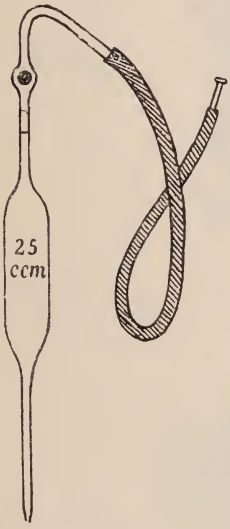
Fig. 4.

Cooling Pipette.

Safety Pipette—Practical Construction.—Karl Zulkowski recommends the safety-pipette shown in the accompanying cut (Fig. 5), which pre-

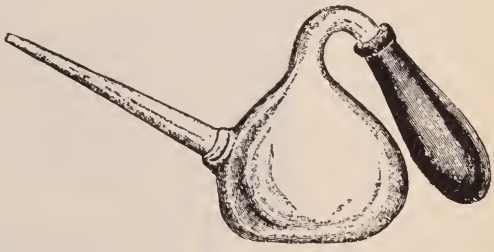
vents the passage of fluids into the mouth during the act of sucking them into the pipette. The upper stem of the pipette is provided with a bulb containing a ball, which during suction from the end of the rubber tube acts as a safety-valve by closing the tube hermetically so soon as the column of fluid rises to the height of the bulb and ball. The upper end of the stem being bent downward at an angle, has the further advantage that the filling of the tube may be plainly observed by the operator, a matter of some difficulty with the straight instrument in ordinary use.—Pharm Centralh., Nov. 17, 1898, 836.

Fig. 5.



Safety Pipette.

Fig. 6.



Reservoir Pipette.

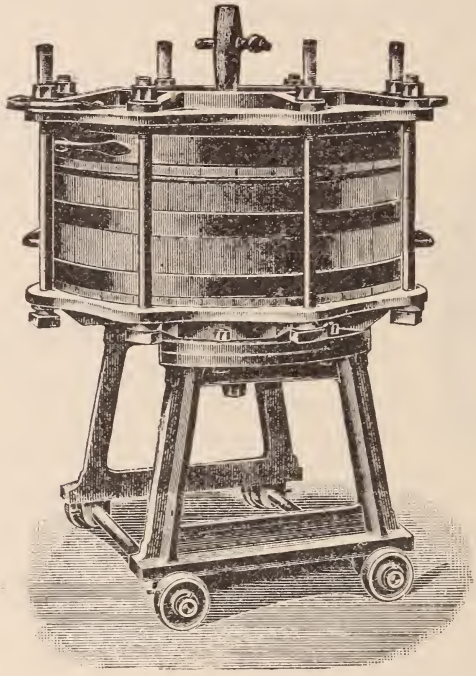
Reservoir Pipette — Constructed for Sterilizing Liquids.—Frank Woodbury describes and recommends the use of the reservoir-pipette shown by Fig. 6. By means of this pipette solutions may be readily sterilized by being boiled each time preparatory to being used, because the glass is very thin, and the tip may be heated to redness also without danger.—Merck's Rep., Nov. 15, 1898, 743, from Philad. Polyclin. vii. 483.

Filtration—Practical Utilization of Infusorial Earth (Kieselguhr.)—Dr. O. Schweissinger has employed kieselguhr (infusorial earth) with practical advantage for the filtration and classification of various liquids. He recommends for this purpose the pure white calcined article of commerce. It is particularly useful for filtering mixtures that are turbid from the presence of bacteria, well water, river water, &c., all of which become brilliantly clear. The filter may be prepared either by the aid of ordinary filter paper, or upon a muslin straining cloth. Raspberry juice filters readily if the kieselguhr is made into a magma with paper-pulp and placed upon a muslin straining-cloth. Kieselguhr is also admirably adapted for the clarification of urine containing bacteria; the filtered urine may then be preserved clear by the addition of a modicum of thymol. Fluids that are only slightly colored, with such substances as aniline, carmine, etc., are liable to become decolorized, however, by kieselguhr-filtration, and pre-

cautions must be observed in this respect. (See also *Infusorial Earth*, under "Inorganic Chemistry.")—Pharm. Centralh., 1899, 87.

Universal Filter — Construction of the Essential Parts of Wood.—A filtering apparatus in which the parts that come in contact with the liquid to be filtered are constructed of wood, is shown in the accompanying cut (Fig. 7), and is particularly adapted to the filtration of beverages, such as

FIG. 7.



Universal Filter.

wines, beer, liquors, or to vinegar, fruit juices, and the like, which suffer when brought in contact with metallic surfaces. The liquid enters the filter through the wooden spigot, to which the supply vessel is united with a rubber tube. The apparatus itself is provided with a number of perforated wooden diaphragms, forming so many chambers, into which the liquid necessarily passes after having permeated through a suitable filtering medium placed upon the diaphragm. Filtration is easily conducted under pressure, and in the case of wines, beer, and other beverages, liquid carbon dioxide serves well for producing the necessary pressure. In practice this apparatus has given the best results. It is manufactured by N. Gressler, of Halle.—Apoth. Ztg., Feb. 15, 1899, 85.

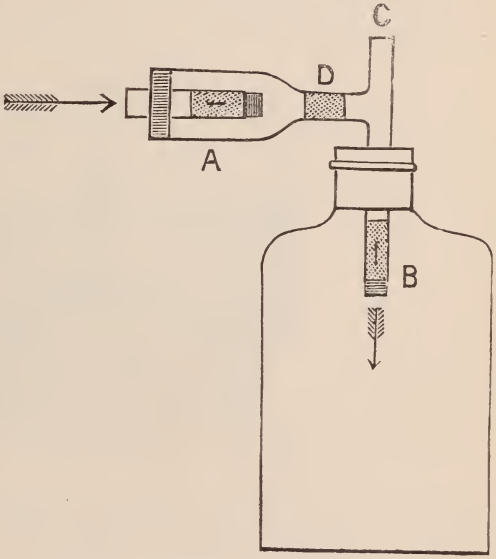
Suction Filter—A New and Practical Contrivance.—Dr. R. Walther has constructed the simple contrivance shown by Fig. 8, which obviates the

necessity of providing different sizes of stoppers to accommodate the different funnels employed in suction filtration. The rubber ring shown in the illustration fits any funnel that may be employed, and, owing to the shape given to the neck of the receiving flasks, forms a perfectly air-tight joint. —Pharm. Centralh., July 28, 1899, 550.

FIG. 8.

Suction Filter.

FIG. 9.



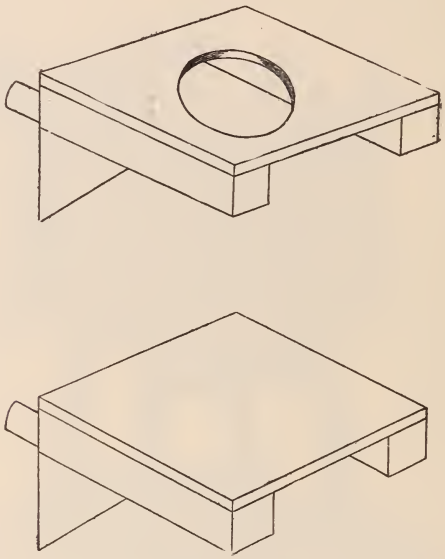
Air Pump.

Air Pump—Simple Construction.—Horace Jervis devised the simple pump shown by Fig. 9, which may be made to provide a stream of air, or water, or to serve as an air pump. A piece of stout soft rubber tubing, *B*, is made into a Bunsen valve with a sharp razor, and a similar valve is fitted into a glass tube, as shown at *A*. An ordinary bicycle-tire inflator is attached to the open end of the T-tube at *C*. On forcing down the piston of the inflator, the air passes through the slit (valve) *B* into the bottle and is prevented from passing through *A*, because the air can only act on the outer circumference of the rubber tubing, and so, as it becomes more compressed, closes the slit tighter; but on raising the piston air is drawn through *A*, and for the same reason cannot pass through *B*. The alternate motion of the piston thus speedily causes accumulation of air under pressure, which may be delivered by means of a tube—not shown in the cut—passing through a second perforation in the rubber stopper bearing the T-tube and reaching the bottom. If the bottle is partly filled with water, this can then be delivered at pleasure. If *A*—from the joint *D*—and *B* are changed about, then an upward action of the piston withdraws air from the bottle and drives it out through *B* on the downward

motion. If then the bottom of the bottle be cut off—the second long tube being omitted—the edges smoothed and fitted to a piece of ground glass, an efficient air pump is produced.—Chem. News, Aug. 12, 1898, 73.

Filter Rack—Economical Construction.—Joseph F. Hostelley suggests several forms of filter racks, designed so as to economize space. One of these is shown by Fig. 10, and is described by the author as follows:

FIG. 10.



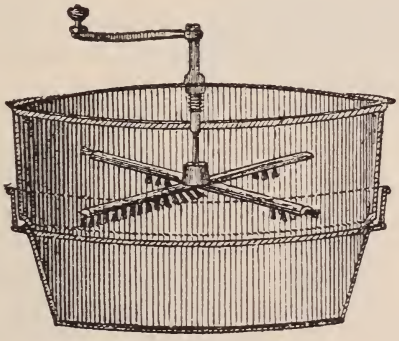
Filter Rack.

The design is for a two-section rack that can be adjusted to the side of prescription bench or operating table in laboratory, and put aside, in a drawer or closet, as may be found most desirable. It was made from poplar wood, and the dimensions are as follows: Each board on devices ¼ inch in thickness and 5 inches square; supporting strips nailed beneath the sides of former ¾ inch square at foremost ends; the triangular brackets were cut in a mitre-box from strips 2 inches wide and ¾ inch thick; the funnel hole in upper device is 2½ inches in diameter. A short piece of each of the supporting strips projects beyond the rear of the devices proper, which has been rounded somewhat less in diameter than the strip itself. Holes are bored with a brace and bit in the side of prescription bench, in the woodwork of the wall, or other suitable place for a filter rack, corresponding in size to these rounded pins, and at a distance asunder the same as that of the pins, into which the latter should fit without the least space to spare; the brackets assisting to uphold the devices when in position. The distance between the upper device or funnel rack and the lower or receptacle shelf, is to be governed by the

ideas and requirements of the operator. It is well to bore several sets of holes, three or four inches intervening, that a tall or short filtrate receiver may be pressed into service, or either a short or long neck funnel.—Amer. Drug., June 10, 1899, 313.

Hand Sieve—Improved Appliance.—Eduard Kressner has made an improvement on his "Universal Hand Sieve," which consists in attaching a stirring arrangement into the lid, as shown in the accompanying cut (Fig. 11). By means of the brushes attached, the lumpy aggregations of

FIG. 11.



Hand Sieve.

powder are divided and pressed through the meshes of the sieve bottom. The lid joint is covered by a rubber band, thus making a tight joint, which prevents the dusting of the powder. (The so-called "Universal Hand Sieve" has been in use for several years, and is similar to that described by Straninski (see Proceedings 1898, 654), in which sieve plates of different meshes may be removed and adjusted according to the fineness of powder desired.—Rep.).—Pharm. Centralh., March 2, 1899, 148.

Maceration—Superiority over Percolation for Making Tinctures.—Wm. Weber gives expression to some very positive views on the subject of maceration in preference to percolation for preparing tinctures, believing that more certain and uniform products are obtained. He proposes to use a sufficient excess of menstruum, so that when the drugs are filtered off, the filtrate will amount in quantity to that otherwise obtained by percolation.—Drug. Circ., Sept., 1898, 216.

Maceration vs. Percolation.—Frank Edel, referring to the recently expressed opinion of Wm. Weber (see before) that maceration with excess of menstruum is preferable to percolation for the ordinary operation of extracting drugs, emphasizes that percolation combined with maceration, as recommended in the Pharmacopœia, is in the great majority of cases much to be preferred to either maceration or percolation separately. There can be no question in the mind of any one who has had occasion to

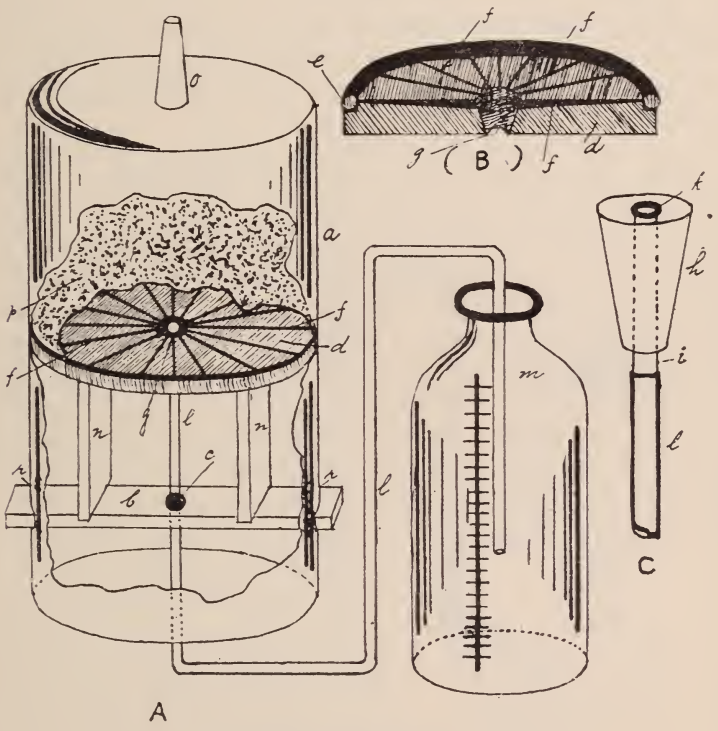
try some of the formulas of the Pharmacopœia, that the fault lies in trying to adapt these processes to the exhaustion of drugs for which they are not suited, such as the fluid extract of couchgrass, for instance. It is the author's opinion, however, that where the process of percolation is properly carried on, all the advantages of maceration are obtained, and at the same time the drug is not allowed to retain any portion of the menstruum containing active principles, for the very reason that percolation is superior over maceration in that no part of strong menstruum is retained in the marc. —West. Drug., 1899, 57.

Percolation—Moistening of Powders.—C. J. Wolff suggests the following convenient method of moistening powders preliminary to percolation, in place of the method officially directed, which is regarded by the author as unnecesssarily tedious. It is to pour the mixed and powdered drugs into an ordinary round tin can with a tight cover, such as are found in every drug store; indeed, an ordinary five-ounce quinine can will answer, but a taller can of the round shape is more satisfactory. Then, holding the can in one hand, the alcohol is gradually poured in while the powder is shaken up from the bottom. Now, tightly covering the can with the lid, it is taken in both hands and vigorously shaken, and in a few moments the powder is so thoroughly and uniformly moistened that nothing better could be desired. The formation of lumps can also be prevented by placing an old-fashioned glass bottle stopper into the can. This method so thoroughly moistens the powder that the use of a sieve is seldom necessary. Another advantage is that when the powder is to be macerated a certain number of hours, it can very conveniently be left in the can and simply set upon a shelf, where there is the proper temperature. The lid prevents evaporation to any appreciable extent, the can is easily shaken occasionally, and the powder can readily be transferred to the percolator.—Amer. Drug., July 25, 1898, 36.

Pressure Percolator—Simple and Useful Construction.—Alfred I. Cohen, calling attention to the drawbacks or imperfections of the pressure percolators that have heretofore been described, describes one of his own construction, shown by Fig. 12, in which the difficulties commonly experienced are overcome. Its construction is simple, easy, inexpensive, and can be carried out by the pharmacist as follows: For the percolator, a can, *a*, is used of any suitable size, and well tinned, in which two oblong holes, *r*, at opposite sides are cut out about 1 inch from the lower edge of the can, and of a size to nicely admit an oblong block of hard wood, *b*. This block should extend about 1 inch beyond either side of the can, and be ¾ of an inch thick and from 2 to 3 inches in width (according to the size of the can). In the centre of the block a hole, *c*, is bored about ¾ of an inch in diameter. The can has a round hole cut out, over which is soldered the spout of a small tin funnel, *o*. The diaphragm, *d*, is next made. This consists of a block of hard wood, about 1 inch thick, or preferably of two

pieces, glued or screwed together, with the grain of the wood at right angles. The block must be circular in form, and cut so as to comfortably fit the percolator. The upper periphery is cut out in the form of an ⌊, so that an elastic rubber ring, *e*, round in section, may be slipped over the narrowed part of the diaphragm and project slightly beyond the circumference. By this means a perfectly tight joint is secured when the diaphragm is forced against the drug in the percolator, the pressure causing

FIG. 12.



Pressure Percolator.

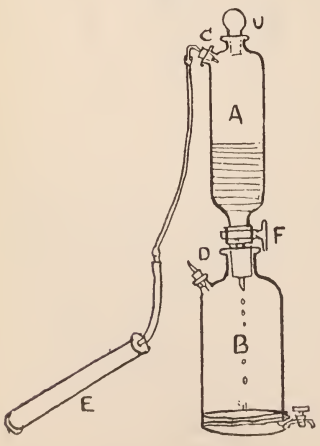
the ring to flatten slightly and to force it against the wall of the percolator. The greater the pressure, the tighter the joint will be. A round, slightly conical hole, *g*, is next cut in the centre of the diaphragm, in which a sound, perforated cork, or rubber stopper, *h*, is fitted. In the upper surface of the diaphragm a number of furrows, *f*, are then sawed, for conducting the liquid to the centre. The furrows are preferably cut so as to be deeper near the centre than at the margin. The cork or stopper has a short glass tube, *i*, thrust through it. The upper end of it is somewhat thickened and expanded, as shown at *k*. The lower end is inserted into a rubber tube, *l*, which conducts the liquid to the graduated receiver, *m*. Two blocks of wood, *n n*, are now provided to support the

diaphragm, as shown. These may be of various lengths, or they may be even hinged to the lower surface of the diaphragm, the free ends being caught in traverse notches cut for that purpose in the block, *b*, so that different quantities of drug may be accommodated by the percolator. The reservoir for the menstruum may be a one or two-gallon can, in the bottom of which a hole has been cut, and over which a tin spout, similar to that of the percolator, has been soldered. The reservoir is suspended from the ceiling, a rope run through a small pulley, serving to raise or lower it at will. A rubber tube connecting the two spouts completes the apparatus. The whole arrangement of the apparatus is shown by *A*, a part of the percolator being torn away to show the disposition of the various parts. *B* is a transverse section through the centre of the diaphragm, and *C* shows the details of the cork and tube.

The percolator is charged as follows: The drug, *p*, suitably ground or powdered, is moistened, and, after swelling, is firmly packed. One or two sheets of filter paper cut to fit the can are then laid on top, and the diaphragm inserted and forced tightly against the drug by means of the blocks *n n*, after having previously placed the block *b* in position. The rubber tubes are then securely attached—one to the glass tube *l*, the other to the reservoir and percolator. On now introducing the menstruum into the reservoir percolation commences; and as soon as the first few drops of percolate are seen, the reservoir is lowered, and the drug allowed to macerate. The pressure obtainable is quite astonishing, and is directly proportional to the height of the reservoir, and is therefore very readily regulated.—Merck's Report, January, 1899, 4–5.

Percolation Under Pressure—Convenient Apparatus.—Arthur W. Nunn recommends the apparatus shown by Fig. 13 for percolation under pressure, which is easily constructed with parts of apparatus commonly employed in laboratories, such as the percolator and receiver used with volatile liquids. Instead of connecting the lower part with the upper with a tube, as is usually done, a bored cork is placed in each of the tubulures, *C* and *D*. Into the cork, *D*, a piece of glass tubing drawn out to a point to allow the passage of air, is fitted, and to the cork *C*, by the aid of a small bent glass tube and about eighteen inches of rubber tubing, a pump *E*, such as is used for inflating bicycle tires, is attached. The substance to be extracted is placed into the percolator *A*, the top, *F*, being closed; the menstruum is added, the stopper, *U*, is

Fig. 13.

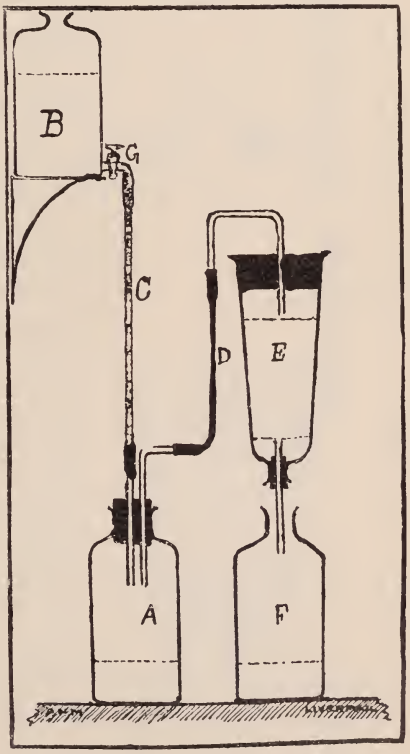


Percolating Apparatus.

inserted and securely tied so as not to be expelled by the pressure subsequently applied. After sufficient maceration, the tap, *F*, is opened and the pump started, when the liquid will run into the receiver, *B*, at a rate which depends upon the pressure deemed advisable or necessary. The percolate is withdrawn from *B* when the menstruum has passed completely, and may be again poured on the drug in the percolator, one or more times, before using fresh menstruum, and in this way exhaustion secured with a minimum amount of solvent.—Pharm. Journ., Oct. 1, 1898, 371.

Referring to Mr. Nunn's method of percolation under pressure, R. C. Cowley observes that the pressure being intermittent is a serious disadvantage. While not advocating the use of pressure in percolation, constant pressure doubtless is of advantage in hastening percolation in some cases, and he has for some time used an apparatus, constructed as shown by Fig. 14, for exhausting certain mucilaginous or finely powdered drugs. The plan adopted consists in displacing air from the bottle *A* by allowing water to run into it from the reservoir *B*; the displaced air is conducted to the tube *D* into the space above the menstruum in the percolator *E*, and this produces, under ordinary conditions, enough pressure to cause rapid percolation. The supply of water may be also obtained from the tap of the regular water supply, or the pressure may be increased or diminished by raising or lowering the vessel *B*. Preliminary maceration, or intercepted maceration, may be maintained at will by lowering the water reservoir to the level of the percolator. It is important, of course that the connection between *B*, *A*, and *E* shall be perfect and air tight. The principle may be also applied to facilitate the filtration of mucilaginous and similar liquids that pass with difficulty under ordinary conditions of pressure, a covered funnel being substituted for the percolator.—Pharm. Journ., Oct. 15, 1898, 418.

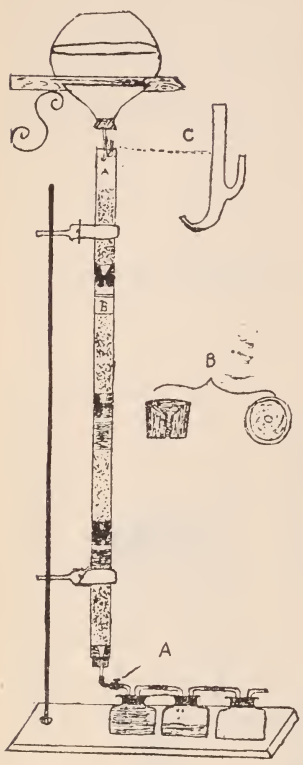
FIG. 14.



Percolation Under Pressure.

Automatic Repercolation—A Novel Apparatus.—John V. Catford, believing that retail pharmacists are more apt to prepare their fluid extracts if the process of repercolation can be simplified, has devised the arrangement of percolators shown in the accompanying cut (Fig. 15), by the use of which the process may be carried out with little more trouble than that of simple percolation. A large glass tube, 2½ feet by 1¼ inch diameter, cut into four equal lengths, furnished four percolators capable of being connected end to end by perforated rubber bungs or corks steeped in paraffin after perforation, which should be funnel-shaped, the widest orifice at the widest end of the cork, as shown at *B*. Each cylinder was capable of containing 32 Gm. of moistened drug and 24 Cc. of menstruum on top. A bit of tubing inserted in the perforated bung, with a feeding bottle "regulator," served to control the rate of percolation, and to connect with the receptacles for the successive portions of percolate. For these were used one-ounce W. M. bottles, adjusted to contain exactly 24 Cc. when full up to the cork, by dropping in pieces of glass stoppers, &c. Two or three of these bottles were connected in series like Woulff bottles, but the tubes not entering below the corks, so that when a bottle was full, the following and less dense percolate passed over to the next, and so on, as it shows at *A*. Calling the percolators *A*, *B*, *C*, and *D*, the following explains the method as applied to "Liquid Extract of Belladonna" by the author. One-fifth of the British Pharmacopœia quantity of powdered root was weighed into eight quantities of 32 Gm. each, one of which, moistened with 24 Cc. of menstruum in a covered pot, was after six hours packed in *A* (with a little tow at bottom). The percolator was then filled up with menstruum, and kept so by one of the well-known contrivances—shown at *C*—used for the continuous washing of precipitates. The inverted flask contains the menstruum, of which at least 600 Cc. will be required. When macerated sufficiently, percolation is started by adjusting the "regulator"; the first 24 Cc. of percolate moistens the second 32 Gm. of powder, which is packed in *B*, the second portion of percolate poured on, and *B* is slipped on to the projecting bung at bottom of *A*, the regulator being

Fig. 15.

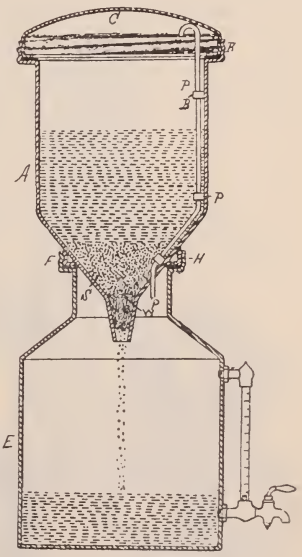


Automatic Repercolator.

transferred to *B*; and so on with *C* and *D*. When all four were connected as in the diagram, and the first three portions of percolate reserved, the supply of menstruum was stopped to allow *A* to drain, as it was now practically exhausted, further treatment with menstruum only yielding 0.4 per cent. solid extract. The exhausted marc was then emptied into a covered jar, and *A* recharged with a fifth 32 Gm. of root, moistened with the fourth "portion" of percolate from *D*, to which it was attached after receiving the fifth portion of percolate, and so on with *B*, *C*, and *D*, which successively come to the top of the column, and after receiving a final portion or two of menstruum, drained, recharged, and attached to the bottom of the column. When all four are recharged, *A* again being the top one, the bottle of menstruum is placed in position, the next four portions of percolate are reserved, and percolation continued to exhaustion, this last percolate being received in one (Oss.) bottle. By this method, with the exception of a short interval during the recharging of *B*, *C*, and *D*, the supply of menstruum, the passing from one percolator to another, and the fractionating of the percolates, are fairly entitled to be called automatic.—Chem. and Drugg., Aug. 13, 1898, 271.

Percolator—Improved Form.—Jos. E. Bernard, of Providence, R. I., has devised the improved percolator illustrated by Fig. 16. The percolator proper, *A*, may be of any suitable material. At the upper end it is provided with a right-angled, threaded flange, *B*, in which the threaded cover, *C*, screws and forms a tight joint. At the lower part of the percolator an annular, right-angled, threaded flange, *H*, is also provided, and by means of this arrangement is screwed into the threaded neck of the receiver, *E*, forming a tight joint. A tube, *P*, secured by projections, *B*, on the inner surface of the percolator extends along the latter, the upper end being bent over on itself, and the lower end extending through the wall of the percolator into the receiver, as shown. The receiver is provided with a cock and glass guage, whereby the percolate may be estimated and withdrawn. A porous or perforated septum is placed at *W*, and is intended for the support of the drug to be percolated.—Merck's Rep., May, 1899, 220.

FIG. 16.

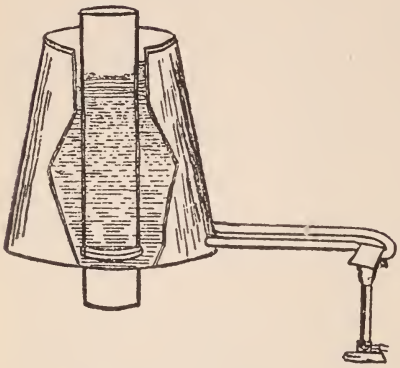


Percolator, Improved Form.

Water-Bath Percolator—Simple Construction.—D. S. Kemp recom-

mends for percolation requiring hot menstrua the arrangement shown (Fig. 17). The outer and inner vessels are of copper, the latter tinned inside and having soldered to it a brass screw fitting another in the bottom of the outer vessel, with a rubber washer between. The apparatus may be placed on a box turned upside or end ways with a hole in it, and the percolate may be easily protected from fire. Between 160° and 170° F. is the usual temperature maintained. The heating-tube is double, like a U, so that a current of water may pass through it constantly. The arms of the tube are on a level (not so slanted as in the figure), to assist the current. A bent piece of tin-plate hung on the arm, above the flame, accelerates the heating.—Chem. and Drug., Dec. 17, 1898, 981.

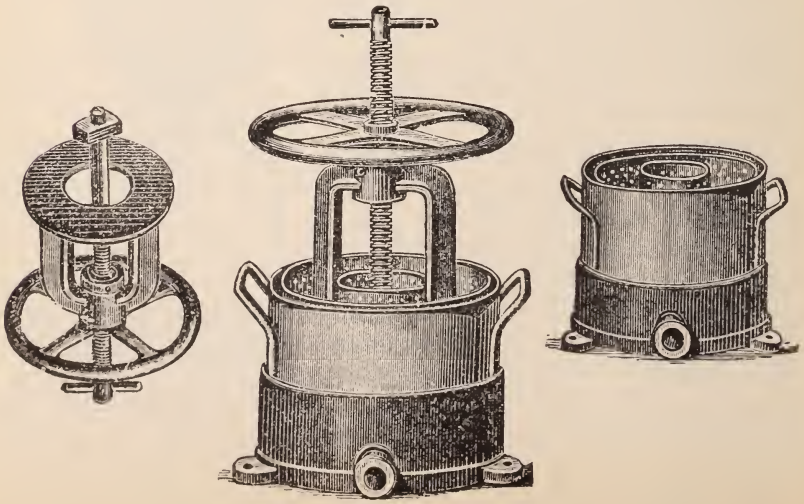
FIG. 17.



Water-Bath Percolator

Pharmaceutical Press—New Construction.—August Zemsch has constructed a pharmaceutical press, which possesses the advantage over others in that the several parts are easily separated, in the solidity of construction, &c. Moreover the efficiency is greatly increased by the provision of an outer and inner perforated cylinder, which increases the rapidity of flow during expression. The several parts of the apparatus are shown by Fig. 18.—Pharm. Centralh., Jan. 5, 1899, 15.

FIG. 18.

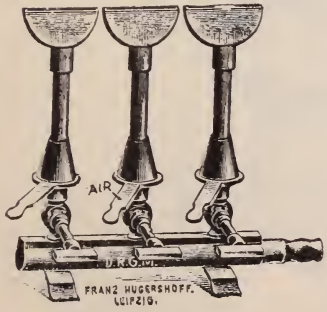


Pharmaceutical Press.

Laboratory Stoves—Utilization of the Ordinary Kitchen Stove.—H. T. Cummings, now of Tacoma, referring to Michael Faraday's description of a chemical furnace, as constructed by him seventy years ago, observes that the builders of stoves employed for culinary purposes have, in many instances, followed Faraday's idea implicitly, with the two exceptions of making the stoves entirely of iron, and in omitting the sand-bath. They have the hot oven, and beneath it a warm chamber, which to the pharmacist is excellent for drying drugs and salts which are too damp to use for certain purposes. If he were at home (in Maine), he believes he could have one of these stoves fitted with a sand-bath by having only the pattern made from which to cast it; the top plate being so arranged with movable covers as to permit the substitution of the sand-bath without further alteration. Back of the sand-bath should be set two five-gallon copper tanks tin-lined, one of which should be religiously reserved for the distilling of water, and the other for hot water for the various uses as needed during the day. The cost of such a stove would exceed to some extent that of the ordinary heater; but to a man who prefers to make his own preparations and not trust himself in the hands of others, the facilities which it will place in his way will more than compensate for the excess.—Bull. Pharm., Nov. 1898, 487.

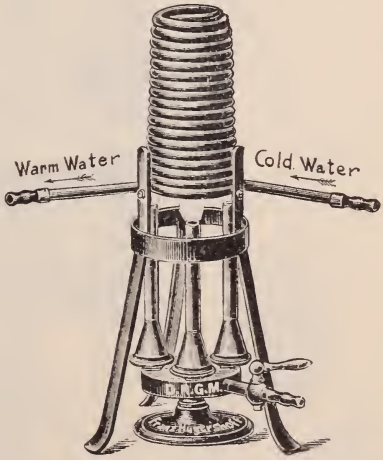
"Teclu" Gas Burner—A New Form.—The burner shown by Fig. 19 is the invention of Teclu, and is designed for operations in which high

FIG. 19.



Gas Burner.

FIG. 20.



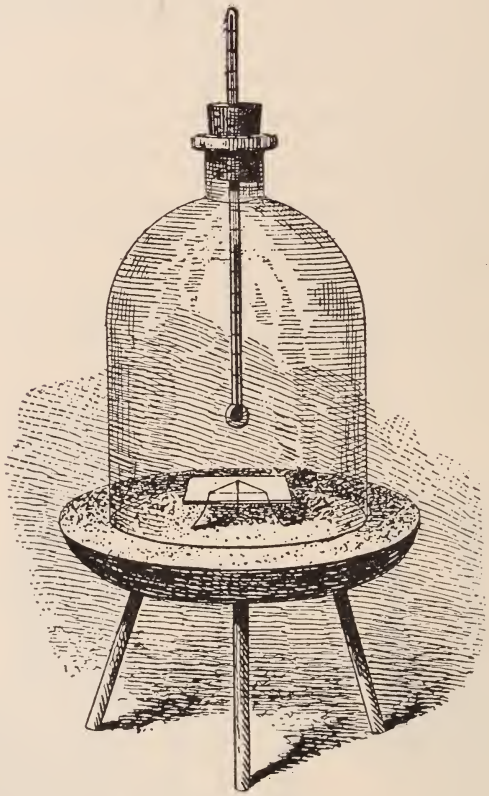
Hot Water Coil.

temperatures are rapidly and continually required. The burners are provided with a lever, as shown, for regulating the air, and are particularly recommended for heating the "Hot water coil" described elsewhere in this report. They are manufactured by Franz Hugershoff, Leipzig.—Pharm. Ztg., March 4, 1899, 152.

Hot Water Coil—Practical Construction for Laboratory Use.—An apparatus for rapidly heating water is shown by the accompanying cut (Fig. 20), which explains itself. It consists of a copper coil or doubly-wound spiral, through which the water circulates as shown. The source of heat is a triple Bunsen burner (or the "Teclu" burner, see page 389), which heats the water during its passage. The coil may be easily constructed by a plumber, while the other portions of the apparatus belong to the ordinary supply of a chemical laboratory.—Pharm. Ztg., March 4, 1899, 152.

Air-Bath—Useful and Economical Construction.—Prof. Richard K.

FIG. 21.



Air-Bath.

Meade suggests the air-bath, shown by Fig. 21, as being cheap, convenient, and possessing points of superiority over the copper or metal oven ordinarily used, particularly in being non-corrosive. It consists of a bottle of suitable size from which the bottom is cut off, or split off, in the well-known manner. The sharp edges may then be rounded with a file dipped in oil of turpentine. A narrow strip of asbestos wound around the neck

will form a convenient handle. This extemporized bell-jar is placed upon a sand-bath or a ring of asbestos paper on a sheet-iron pan or iron plate. The sand-bath, pan, or plate is held above the flame by a tripod. The object to be heated is placed upon a piece of glass or porcelain raised above the sand-bath by a wire bent in the form of a small tripod. If it is desired to regulate the temperature, a thermometer is thrust through a cork in the mouth of the bottle. Large grooves should be cut lengthwise along the side of the cork, in order to allow the free escape of the steam or vapors; in fact, there should only be just enough cork to hold the thermometer in place.—Merck's Rep., May, 1899, 218; from Scient. Amer., lxxx., 230.

Sterilizing Apparatus—A Convenient Form for Small Operations.—

FIG. 23.

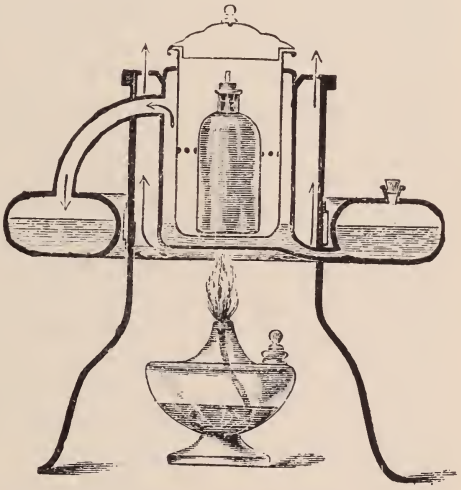


FIG 22.

FIG. 26.

FIG. 24.

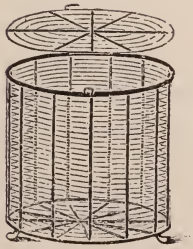
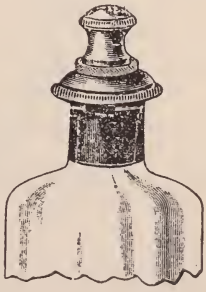


FIG. 25.

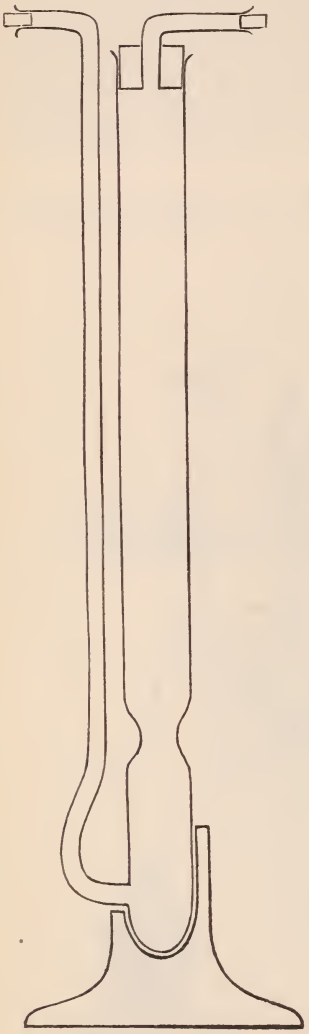


Sterilizing Apparatus.

Holz recommends the apparatus, shown by the accompanying cuts (Figs.

22 and 23), for rapidly sterilizing small quantities of liquids or other substances. The inner vessel or cap (Fig. 22) is made of sheet copper, 11.5 Cm. high by 7.5 Cm. in diameter; it is provided with a collar by means of which it rests upon a flange in the boiler, and is thus suspended in the latter without coming in contact with direct heat. It is perforated with numerous holes at a height of 6 to 7 Cm. from the bottom for the admission of the steam necessary to sterilize the objects that are placed in it. The apparatus in operation is shown by Fig. 23, and needs no explanation. For the convenient sterilization of bandages and the like, wire baskets constructed of suitable dimensions as shown by Fig. 24 are provided. For stoppering the sterilizing flasks the author recommends metallic stoppers similar to those now so commonly employed for toilet waters (Figs. 25 and 26). For this purpose, however, the central tube is provided with a number of holes, which are allowed to remain open during the process of sterilization, as shown by Fig. 25. When the sterilization is effected, the cap *c* is screwed down tightly on the rubber ring *b*, resting on the collar *a*, and these produce an effective air-tight joint.—Pharm. Ztg., July 9, 1898, 491.

FIG. 27.



Drying Tube

Drying Tube—Convenient Form.—A. G. Vernon Harcourt has devised and recommends the drying tube shown in the accompanying cut (Fig. 27), which is free from the inconveniences and defects of those ordinarily in use, and requiring numerous corks and connections. The shape is that of a Gay-Lussac burette with a constriction about two inches from the bottom. A piece of pumice large enough to block the constriction is first dropped in, and the tube is filled to near the top with small fragments of pumice. Sulphuric acid is then poured into the tube to saturate the pumice, taking care not to wet the upper part of the tube. The excess drains into the lower part of the tube, and its height is marked next day by means of a strip of paper pasted on the

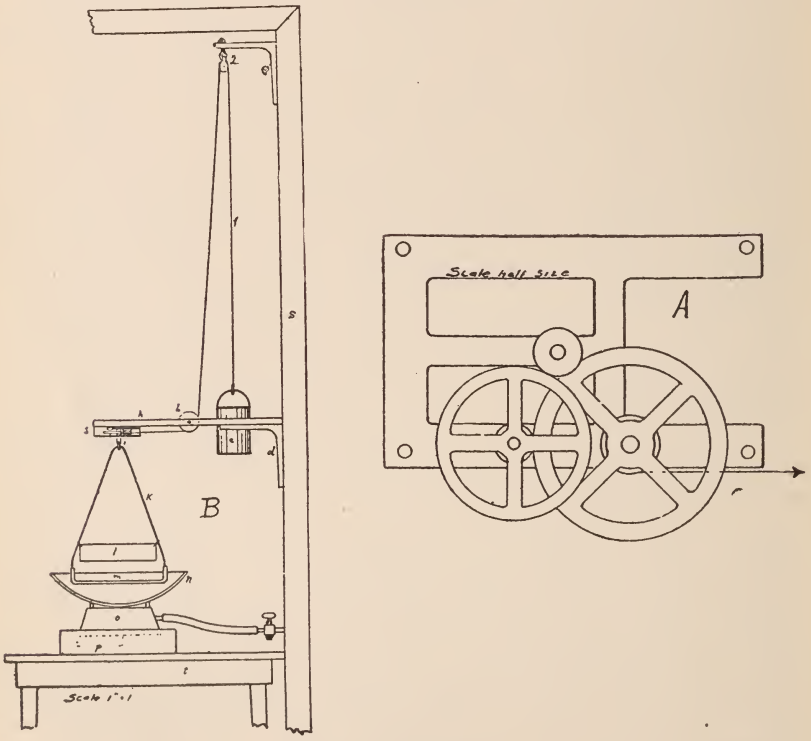
outside, so that, when in use, the dilution of the acid may be noted by the increase in volume, the acid being changed when this increase amounts to 2 Mm. above the mark. The gas is admitted through the small tube which enters the large tube near the bottom—the inlet and outlet tubes being made of the same height, so that a battery of drying tubes may readily be joined together. The special advantages are that the apparatus requires only one cork, that it stands upright on a safe support, and that it is at once a wash-bottle and drying tube. When a change of acid is necessary, the acid is poured out of the small tube and replenished through the top of the larger after removing the cork, and with the precaution before mentioned.—Chem. News, Sept. 23, 1898, 156.

Extreme Temperatures—Methods of Measurement.—At a meeting of the Royal Institution of Great Britain, March 10, 1899, Professor H. L. Callender delivered a lecture on measuring extreme temperatures, his remarks being confined to the question of measuring high temperatures—the difficulties encumbered, rather than the achievements. In attacking the great problem of the heat of the sun, it is necessary to first measure the radiation from the sun and then determine the law of radiation. By calculation the heat of the sun may then be obtained; but the difficulties are so great that no concordant results have yet been secured. The experimental range of temperature measurement is at present limited to about 1200° on the absolute scale, and the extension of this range is one of the main objects of present-day experimental research. Numerous methods of high temperature measurements are in vogue, some of the most important being those in which the metals of the platinum group are employed. One of these methods depends on the expansion of platinum, Joli's meltometer being an excellent instrument of this class, though its use is restricted to metallurgical operations. The specific heat method is of more general application, but somewhat tedious. The principle involved in this is that the specific heat of the metal used increases uniformly with the rise in temperature. The thermo-couple method has given excellent results, using, for example, a junction of platinum and palladium or of gold and silver. Another method, also an electrical one, is the platinum resistance thermometer, which was invented in 1870 by Sir William Siemens, and depends upon the fact that the resistance of a wire to a current of electricity increases as the temperature rises. By the use of another class of thermometers—the gas thermometers—the nearest approach to the absolute zero of temperature has been made, and it may yet be possible to extend the range of the instrument in the opposite direction. There are several varieties of air thermometers for use in pyrometry, which are applied in different methods: (1) The bulb methods, which may be concerned either with expansion of volume or increase of pressure; (2) an optical method, depending on change of refractivity; (3) an acoustical method, whereby the wave-length of sound

is noted, and (4) resistance methods, dealing either with effusion through a small orifice, or transpiration through a fine tube. Professor Callender considers that the resistance methods have many advantages, and he showed many careful experiments, proving the extreme delicacy with which the measurements may be made by reflected light from the mirror of a galvanometer upon a properly graduated scale. The operations are simple, rapid and economical, the apparatus is highly sensitive, and among other advantages there is only one scale to read. There is no question of leakage or porosity, and no irregular changes in volume have to be taken into account. The resistance of a tube to the passage of air is measured, because it is found that the resistance to effusion is proportional to the temperature on the absolute scale.—Pharm. Journ., Mar. 25, 1899, 292.

Stirring Apparatus—Novel Construction.—Edward M. Post gives the

FIG. 28.



Stirring Apparatus.

following description of a convenient stirring apparatus, shown by the accompanying cuts (Fig. 28). In front of a window, which may be lowered to allow exit of vapor, the table, *t*, was placed, on which is a box of sand, *p*, to prevent warping and charring of the table top; in this is

placed the gas stove, *o*, on which rests the evaporating dish, *n*, or two dishes may be used and a water-bath formed. The next requisite is the works from an old eight-day clock, three wheels of which were retained in the metal frame, as shown in *A*. These works, *g*, were nailed to the end of a pine board, *h*, of suitable width, which in turn was fastened to the window casing, *s*, by means of the iron bracket, *d*. A piece of wire was inserted in the hand-post, and twisted so as to form a loop, *i*, through which was passed a piece of $\frac{1}{16}$-inch, half steel wire, *k*, bent as shown in cut. A piece of tin was next taken, cut in the shape shown by *l*, and a loop of wire fastened in each upper corner, through which the two arms of *k* pass and enter the bent ends of the ¼-inch No. 2 glass tubing, *m*, which is held at any required height by the lateral spring of the wire. A piece of eight-ply picture-frame wire, *f*, was next obtained, one end of which was fastened to the barrel of the clock wheel, the other carried over the grooved wheel, *b*, through the block, *a*, and fastened to a tin can, *e*, by means of a wire bail, inserted through two holes punched in its side. At the beginning of the operation the evaporating dish is two-thirds filled with liquid, the glass-tube arranged so that the horizontal portion is two-thirds immersed. The works are then to be wound up, and sufficient sand or other heavy material placed in the can *e*, so that a slow constant motion will be imparted to the stirrer. When the liquid in the dish has been set in motion, the gas is lighted, and the operation then becomes automatic, with the exception of winding every half hour.—Amer. Drug., April 10, 1899, 191.

Reflux Condenser—Practical Arrangement.—Prof. V. Storch has de-

Fig. 29.

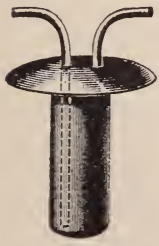
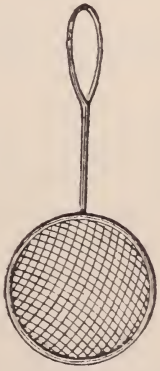


Fig. 30.

Reflux Condenser.

Fig. 31.



Holder for Watch-glass.

vised the little arrangement shown by Fig. 29, which, when introduced into the upper opening of a Soxhlet Extraction apparatus, as shown by Fig. 30, serves admirably as a reflux condenser. It consists of a nickel brass tube closed beneath and above, the edges of the cover extending

considerably. The cover is bi-perforated for the admission of the inflow of the cooling fluid to near the bottom and the outflow at the top. When introduced into a Soxhlet apparatus, it serves the purpose of condensing the volatile extraction liquids, ether, petroleum ether, or alcohol, admirably. By suitable connection with rubber tubings, a battery of these condensers and extraction apparatus may conveniently be established, the cooling liquid traversing the whole series.—Pharm Centralh., March 2, 1899, 142.

Holder for Watch-glasses—Simple Construction. — Dr. V. Korn has used the holder shown by Fig. 31 with convenience and advantage for heating operations on watch-glasses. It is easily made with wire and wire gauze.—Pharm. Ztg., May 17, 1899, 343.

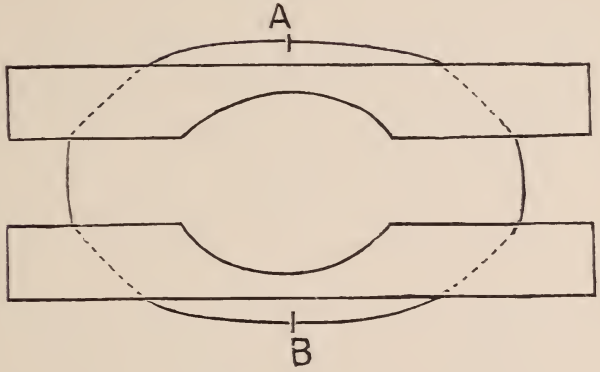
Enameled Vessels—Examination of Enamel.—A recent case of fatal poisoning having been traced to an enameled iron saucepan of the familiar kind, white inside and blue outside, L. Barth subjected the enamel to analysis, and found it to contain neither lead nor arsenic, though some French enamels have been known to contain as much as 52.51 per cent. of lead oxide, and 3.74 per cent. of arsenic acid. It did contain large proportions of silica, tin and aluminum, with small quantities of zinc, lime and potash, and traces of iron and cobalt.—Chem. News, Jan. 13, 1899, 24; from Jour. de Pharm. (1899), viii., No. 3.

Glass Stop-Cocks—Useful Lubricant—F. C. Phillips recommends the following mixture as an excellent lubricant for glass stop-cocks. Pure rubber, 70; spermaceti, 25; soft paraffin, 5. The rubber is melted and the other ingredients are then stirred in, avoiding exposure to air while heating and subsequently. The lubricant is quite translucent in thin layers, and protects the stop-cocks from sticking, even when used for concentrated solutions of caustic alkalies.—Jour. Amer. Chem. Soc., 1898, xx., 678.

Flask Clamp—Simple Construction.— Horace Jervis has devised the clamp shown in actual size by Fig. 32, which is intended to serve the purpose of suspending flasks in which solutions containing heavy precipitates are being boiled. Such solutions are always in danger of bumping, and when the flasks containing them are solidly supported on the customary tripod they are frequently overturned, and sometimes shattered. The small pieces of wood, which are $\frac{5}{8}$ inch thick, have a complete circuit of string slackly threaded through oblique holes. The separate ends of another piece of string are attached to *A* and *B*, so that, after passing the clamp over the neck of the flask, the suspension by this latter string causes the wood to grip on to the neck, and the flask is just as firmly supported as the neck is strong. Obviously, the arrangement may be used for suspending flasks for a variety of purposes. In place of ordinary string, smooth leather, and particularly porpoise boot-lace, are very durable ma-

terials for threading and suspending the arrangement.—Chem. News, Nov. 25, 1898, 257.

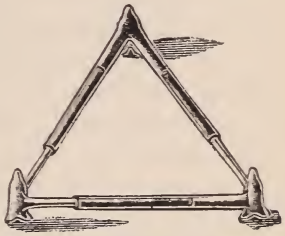
Fig. 32.



Flask Clamp.

Adjustable Tripod—Construction.—Dr. A. Junghan has devised the adjustable tripod shown by Fig. 33, which serves a convenient purpose in the laboratory. It may be constructed either of glass or metal (brass and the like). The construction of glass is quite simple. To three glass feet, shaped as shown in the cut or of similar form, a piece of a glass rod is fastened by the aid of the blow-pipe flame on one side and a section of glass tube, into which the rod will slide conveniently, on the other, so as to form an angle of 60°. By slipping these several parts into and over each other, the size of the tripod produced may be adjusted at will to accommodate the size of the vessel to be supported.—Pharm. Centralh., March 2, 1899, 140.

Fig. 33.



Adjustable Tripod.

Laboratory Tables—Useful Ebony Finish to Tops.—A satisfactory finish for a laboratory table, especially in chemistry and biology, is highly desirable. When the microscope is used, a black surface is obviously preferable. It is also desirable to have a finish that can resist the action of the common chemicals which either stain or corrode the ordinary wood tops. For several years table-tops ebonized by a process which has been in use in several laboratories in Copenhagen, have been introduced in the bacteriological laboratory of the University of Wisconsin by Prof. Woll. The method is described by Prof. Barnes as follows : Two solutions are required :

I. Copper sulphate, 125 Gm.; potassium chlorate, 125 Gm.; water, 1000 Gm. Boil until salts are dissolved.

II. Aniline hydrochloride, 150 Gm.; water, 1000 Gm.; or, aniline, 120 Gm.; hydrochloric acid, 180 Gm.; water, 1000 Gm.

By means of a brush apply two coats of solution No. I. while hot, the second coat as soon as the first is dry. Then apply two coats of solution No. II. and allow the wood to thoroughly dry. A coat of raw linseed oil is next applied. It is best to use a cloth instead of a brush, so as to get only a very thin coat of the oil. The desired amount of polish is now given the wood by rubbing in the oil. In the treatment with the oil, the deep black color is partially brought out, although this does not uniformly appear until the table has been thoroughly washed with hot soap-suds. This takes out the superfluous chemicals. The finish thus secured is an ebony black, which is permanent and very highly resistant to the action of chemicals, such as acids and alkalies, even concentrated sulphuric acid having little or no effect if quickly washed off. To keep the surface constantly in good condition, it is only necessary, after a thorough washing, to rub on a light coat of oil. The expense is trifling. The cost of both solutions, in the quantities given above, will not be over fifty cents, and this amount will cover at least ten square yards of surface.

Cutting Glass Bottles—Simple Instruction.—Prof. F. J. Wulling suggests the following method for cutting glass bottles, which has been very successful at his hands: Introduce cotton-seed oil into the bottle up to the point at which the fracture is desired. Heat one end of an iron rod (the rod in an ordinary retort stand will do) that will go into the bottle, until it is white hot, introduce it into the oil carefully in a way to avoid splashing, and hold there for a time. Soon a cracking will be heard, and upon examination it will be found that the fracture is a perfect one. If the glass of the bottle is thick, the fracture can be hastened by having the bottle standing in cold water. A tall narrow bottle can be quickly converted into a cylindrical percolator by cutting about half an inch from the bottom. A tall quart olive-oil bottle can be converted into a tube suitable for use in a well-tube percolator by cutting just below the neck and again just above the bottom. A file-mark will facilitate the fracture. If desired, the sharp edges may be ground flat on a smooth stone (flag-stone) or on glass with sand and a little turpentine and vaseline.—Pharm. Era, March 16, 1899, 338.

Bottle Labels—Practical Observations.—Supplementary to his previous note on the use of sealing-wax for labeling bottles in the laboratory (See Proceedings, 1898, 656), Horace Jervis suggests that instead of lettering with a stiff brush, a piece of glass tubing drawn out at one end is easier to use, and gives the letters a beaded appearance. When the solution of sealing-wax is partially evaporated and somewhat thicker, a rubber tube joining the pen and the lips enables the sealing-wax to be forced out as required. In this way one can letter as quickly as with pen and ink. The wax is not brittle when dry, and thus supplies a very durable as well as

tasty means of lettering the backs of note-books.—Chem. News, Aug. 5, 1898, 63.

Brushes and Pencils—Construction for Automatic Supply of Fluid Medicines, etc.—Kromar has constructed brushes and pencils which, when screwed into the neck of flasks or other suitable containers filled with liquid medicaments or salves, are automatically supplied by means of an opening in the center of the stopper to which the brush or pencil is fastened. This opening carries a soft rubber, conical receptacle, reaching with its pointed end to nearly the full length of the bottle, and having at near the extremity two small slits, through which the fluid is pressed when the brush or pencil is applied to the skin in the usual way. Such brushes may also be used for moistening and pasting labels.—Pharm. Post., 1899, 299.

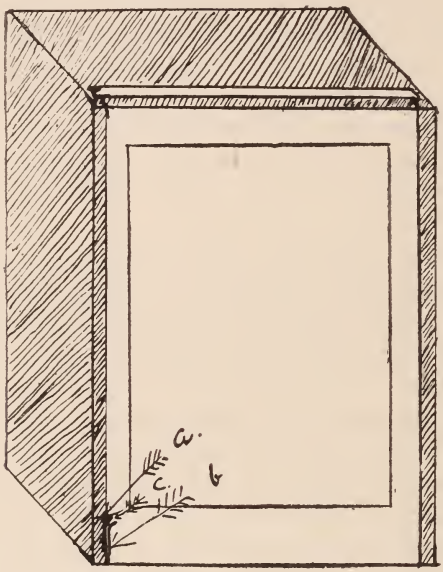
Spatula Polisher—A Convenient Device.—Jos. F. Hostelly gives a description of a simple contrivance for polishing steel spatulas: A piece of board, ½ inch thick, 6¼ inches long, is cut paddle shaped, so that the paddle-end shall be about 2½ inches in width, and the front (or handle) end about 1½ inches wide. A second piece of board is cut of the same dimensions, except that it runs of a uniform width of 1½ inches throughout. One of the ends of this board is fastened by a hinge to the paddle-shaped end of the other, while the opposite ends of the boards are beveled off on the edge, like the blade of a chisel. The two surfaces of the boards that are thus in contact are covered with oo emery cloth, which must be fastened with an adhesive mixture. A rubber band being then slipped over the two boards, and the lower board fastened to a suitable support by the projecting flaps of the paddle-end, the apparatus is ready for use. By passing the spatula to and fro, polishing is rapidly effected.—Drug. Circ., May, 1899, 99.

Aluminum Cans—Advantageous Use for Storing and Supplying Volatile Oils.—Messrs. Schimmel & Co. call attention to aluminum cans—which are now constructed successfully in a seamless form—entirely free from solder—for storing and supplying volatile oils. These cans are exceedingly strong and hard, and are so light—weighing only about one-fifth to one fourth as much as the Chinese cassia oil cans, for instance, as to save a considerable item in freight. Moreover, aluminum does not act upon essential oils, not even on their color, while, as is well known, some oils, such as natural cassia oil, when kept a long time in the usual containers, dissolve lead enough to render their use rather objectionable. The neatness of the packages also commends itself.—Schimmel Report, October, 1898, 70.

Poison Cabinet—Convenient Form.—Will F. Roach suggests a convenient form of poison cabinet provided with an automatic electric alarm, the several parts of which are shown by Figures 34, 35 and 36. The inside

measurements of a fairly good-sized cabinet are as follows: Height, 48 inches; width, 34 inches, and depth, 8 inches; and it should be provided with a glass door, which slides upwards. Cleats may be screwed in on both sides, on which rest ¾ or ½-inch shelves; the distances between

Fig. 34.



Poison Cabinet

Fig. 35.

Fig. 36.

shelves depending, of course, on the sizes of bottles it contains. Procure two pieces of brass, ½ inch broad, 1½ inches long, and 1-16 inch thick, punch two holes in one piece and screw it against the side of case, outside the door, about ½ inch from the bottom, as in *a*, Fig. 34. Now take the other piece, punch a hole near the bottom, and after bending it to shape shown in Fig. 35, secure the bottom to side of case on top of *a*, but ½ inch lower down (*b*, Fig. 34). Now make a wedge of hard wood or hard rubber in the shape shown in Fig. 36, ¾ inch long, ½ inch broad at top, and screw it on the door *c*, Fig. 34, so that when the door is shut it will come between the two pieces of brass and separate them. Now obtain from a dealer in electric supplies a good dry battery, a few feet of No. 18 annunciator wire, and an electric bell, either single-stroke or one which rings till the current is broken. Screw the bell in place on the side of cabinet, or any convenient place, and run a piece of the wire from one binding screw to one pole of the battery; from the other pole run a piece of wire to piece of brass *a*, Fig. 34; loosen screw and shove the end of wire underneath brass and around screw. The piece of brass *b*, Fig. 34, is now to be connected with the other binding screw on bell, and the cabinet is completed. When the door is raised for the removal of a bot-

tle or package from the cabinet, the two pieces of brass come together and complete the circuit, causing the bell to ring, which draws the clerk's attention.—Amer. Drug., Sept. 14, 1898, 161.

Prescription File—A Home-made Form.—The accompanying diagram (Fig. 37) explains the manner in which Ed. E. Williams makes cases for filing prescriptions. The cases are cut after a paste-board model out of sheets of heavy manila paper. The dotted lines are creases made with a

Fig. 37. Plan.

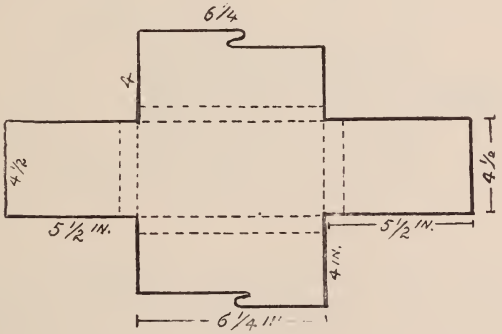
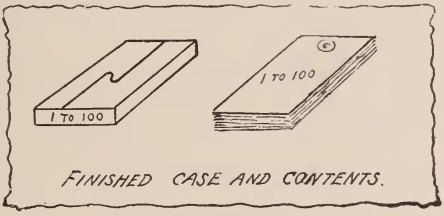


Fig. 37 *b*. Complete.



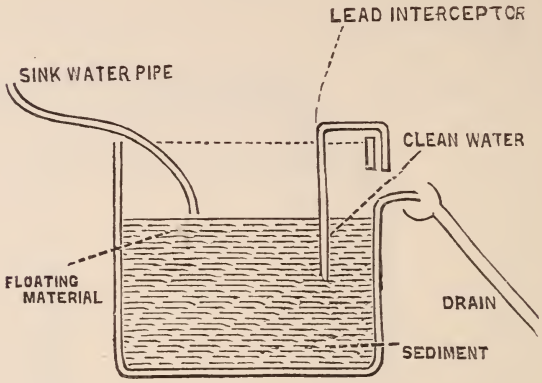
Prescription File.

knife, so as to make square and even folds. After folding, the end of the file is numbered to indicate the contents. The prescriptions are kept upon a spindle until the hundred is complete and then a copper rivet of suitable length is passed through and the washer riveted on in such a manner that the prescriptions move freely upon it. The finished case is shown (Fig. 37 *b*).—Am. Drug. Aug. 10, 1898, 65.

Sediment Trap—A Simple Device for Laboratory Sinks.—Arthur H. Coate has devised the simple contrivance shown in the accompanying cut (Fig. 38) which may serve a good purpose in pharmaceutical laboratories. It consists of a sheet of sheet-lead bent twice at right angles, so as to fit across the trap, and be supported in its place by the front and sides of the trap. It effectually prevents paper, matches, corks, etc., either from

choking the outlet and causing the trap to overflow, or from passing into the drain itself.—Chem. News, May 26, 1899, 241.

FIG. 38.



Sediment Trap.

The Drug Store Cellar—Convenient Arrangement.—F. C. Weber contributes an essay on the Drug Store Cellar, which deserves to be read attentively by pharmacists, old and young, since this part of the pharmacist's premises is usually the least interesting. A neatly-kept cellar shows care and good management, prevents mistakes in refilling containers for the store, gives work for idle hands to do, lessens the danger of fire, and establishes methods of order, carefulness and precision in the apprentice—for a pharmacy, above all places, should answer to the rigid rule, "a place for everything, and everything in its place." How these ideas of the author can be best carried out is shown in this paper, which is illustrated by cuts showing the ideal arrangement of the cellar, shelves, bins, etc.—Amer. Drug., July 11, 1898, 3–4.

ACETA.

Acetum Scillæ, Ph. Germ.—Loss of Acetic Acid—as such—on Keeping.—The Germ. Pharm. requires that vinegar of squill shall possess a certain acidity, when tested with normal alkali. J. Krosz calls attention to the fact that by keeping the alcohol (of which the Germ. Ph. preparation contains about 10 per cent.) is gradually converted into acetic ester, and the acetic acid so consumed is lost to reaction with normal alkali. The formation of the ester is independent of the squill constituents, and occurs as well in the absence of light and air as when exposed to their influence.—Apoth. Ztg., Oct. 1, 1898, 693.

ACIDA.

Aromatic Sulphuric Acid—Commercial Variation.—Chas. W. Beyerle determined the percentage of official (92.5 per cent.) sulphuric acid in

12 commercial samples of aromatic sulphuric acid, with the following results: 10.26, 15.33, 12.20, 11.34, 10.26, 13.39, 12.42, 16.41, 11.34, 11.34, 20.89 and 9.72 per cent. The United States Pharmacopœia requires this preparation to contain *about* 20 per cent of the official sulphuric acid, the variation allowed being between 19.6 and 20.4 per cent.—Amer. Journ. Pharm., Mar., 1899, 144.

AQUÆ.

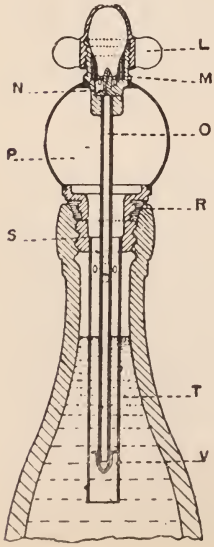
Aromatic Waters—Quantitative Estimation of Volatile Oil.—Erich Ewers, after reviewing the meagre literature concerning the assay of aromatic waters, and finding the method of M. F. Ranwez, which depends upon shaking out the water by means of rectified ether after adding a certain portion of sea salt, to give unreliable results, communicates a method which, he claims, gives uniformiy satisfactory results. This method is briefly as follows: To 400 Cc. of the water under examination, 100 Gm. of sodium chloride are added, and the solution is shaken with 50 Cc. of petroleum ether (b. p. below 50°). After complete separation into two layers, an aliquot part of the petroleum ether solution—conveniently 25 Cc.—is removed, transferred to a small flask containing 0.1 to 0.15 Gm. of olive oil, and subjected to evaporation by drawing a current of air through the flask by means of an aspirator. The weight of the residual oil, minus the weight of olive oil placed into the flask, gives the quantity of volatile oil. The author has convinced himself on the following points: In the presence of a small quantity of fixed oil there is no loss of volatile oil by continuing the aspiration for a long time at the ordinary temperature, after the petroleum ether has been completely evaporated: the presence of alcohol, up to 10 per cent. (due to the use of essence) in the aromatic water does not interfere with the efficiency of the method; the trouble due to the presence of water in ether solutions of the oil is entirely avoided; the results are reliable. The author gives a long and highly interesting number of examples of the application of the method to the examination of aromatic waters made by different methods and under different conditions. The results speak in favor of water made by distillation from the drugs, rather than for those made from the volatile oils. So far as the process of distillation is concerned, of course much depends upon the quality of the material; but in a general way it may be held that condensation in a worm condenser is more efficient than in a straight condenser, and maceration in water before distillation is better than the direct passage of steam, while the degree of comminution has also much to do with the content of oil in the aromatic water, the finer cut drugs yielding better product than those in a coarse condition. The waters examined by the author were mainly those of fennel and peppermint, cinnamon water being experimented on only in connection with the products obtained by distillation from the drug.—Apoth. Ztg., September 17 and 21, 1898, 653–656 and 662–664.

Camphor Water—Novel Method of Preparation.—F. W. E. Stedem states that camphor water can always be had in quantity and without the least trouble if usual fair-sized pieces of camphor are weighed with fragments of glass rod or selected clean stones and immersed in a suitable quantity of distilled water. After a few days' standing the water will be found to be saturated. The process is that of circulatory displacement; those particles of water next the camphor, becoming saturated, ascend to the top of the vessel, and so on continuing. Each time camphor water is required and taken from the vessel an equal quantity of fresh distilled water is to be added, and in this way the supply becomes inexhaustible.—Amer. Jour. Pharm., April, 1899. 163.

Chloroform Water—Preparation of Definite Strength.—Mausier prepares chloroform water of definite strength by making allowance for the small amount that is vaporized in the containing vessel. He finds that 100 Cc. of air will retain about 0.1 Gm. of chloroform. Accordingly, to prepare a solution containing 0.5 Gm. per 100 Gm., he weighs 4.6 Gm. of chloroform into a small flask and adds this to 900 Gm. of distilled water contained in a litre flask. The whole is then agitated until the chloroform globules disappear, and the finished chloroform water is transferred to smaller containers which are filled to the top and securely corked.—Pharm. Journ., July 23, 1898, 73; from Journ. de Pharm. et Chim., 1898. 585–587.

Mineral Waters—Sterilization.—Dr. Morgenroth gives an account of some experiments made by him on a technical scale to determine the feasibility of sterilizing mineral waters. He finds this to be perfectly practicable. The water must be heated in a suitable apparatus, may then be carbonated after cooling, and must be at once filled into containers which have been sterilized by heating in a steam bath during several hours. — Apoth. Ztg., Feb. 22, 1899, 95.

FIG. 39.



Carbonated Beverages—Extemperaneous Preparation.—A clever device for preparing carbonated beverages extemporaneously has been introduced by a London firm. The apparatus consists of a bottle about the size of an ordinary soda-water bottle with a special stopper. This bottle being filled with water, a small steel capsule called a sparklet, containing 2 Gm. of liquid carbonic acid, is inserted in the stopper, which is then screwed down, the method of aeration being readily understood by a glance at the accompanying cut (Fig. 39) and description: When the sparklet is inserted in the sparklet-holder, *M*, it stands in a vertical position, surrounded at the neck by a small rubber

washer, and resting on the piercing-pin, *N*. The screwing on the cap, *L*, forces the sparklet directly on to the pin, *N*, which pierces it and allows the carbonic acid gas to escape. The pin is provided with a hole running along its axis and communicating with the tube, *O*; the gas passes along this tube to the nozzle, *V*, and, finally, through the minute hole in same into the water. In passing through the water from the injector a large proportion of the carbonic acid gas is at once absorbed, and the remaining gas passes into the globe or receiver, *P*, by the centre tube, *T*, and through the opening at the bottom of the ball or globe. A few shakes of the bottle serves to absorb the remaining gas. The bottle is screwed in the neck or mouth to receive the screw, *S*, at the base of the stopper, while an India-rubber washer, *R*, is provided to insure making a good joint between the stopper and the bottle. This little apparatus is said to work admirably, is easily used, and produces a water of a fine sparkle; and if care is taken to boil the water used, a thirst-quenching beverage of absolute purity can be relied on.—Merck's Report, July 15, 1898, 436; from Brit. & Colon. Drug.

Rubinat Water—New Analysis.—According to a recent analysis of Dr. Bender and Dr. Hobein, Rubinat water contains the following solid constituents in 1000 parts: Sodium sulphate, 96.096; potassium sulphate, 0.305; magnesium sulphate, 3.451; calcium sulphate, 1.860; sodium chloride, 1.995; total solids, 103.745. These results correspond very closely with those published by the Paris Academy of Medicine. Rubinat water possesses the advantages over other natural bitter waters in its high concentration, and in that its therapeutic efficiency is neither affected by light or heat. In the cold some of the salts may separate, but these again enter into solution on heating.—Wien. Klin. Wochenschr., 1898, 738.

CAPSULÆ.

Methylene Blue Capsules—Preparation.—Referring to a recent statement in "Merck's Report," to the effect that in dipensing methylene blue in capsules, the quickest and cleanest method of making up this substance in capsules is to mass the crystals with glucose and to roll out the mass in charcoal powder, covering also the hands with the latter, James Barr remarks that in his experience the methylene blue may be dispensed more expeditiously by simply putting it dry in the capsules. "Take the methylene blue in crystals, rub in a mortar to a powder (not too fine), divide in the usual way, and fill, dry, in capsules of a suitable size. The author has done it in this way time and again, and is well satisfied both with the expedition and cleanliness of the method. The methylene blue may be weighed on counterbalanced paper, while the mortar is easily cleaned with water and a little hydrochloric acid."—Nat. Drug., Aug., 1898, 235.

Oil of Male Fern Capsules—Efficient Formula.—Feodor Miehle recom-

mends the following formula for making oleo-resin of male fern capsules: gamboge, 5 Gm.; castor oil, 251 Gm.; croton oil, 15 drops; oleo-resin of male fern, 125 Gm. The gamboge and castor oil are digested together for several hours on a steam bath, the solution is filtered, the croton oil and oleo-resin are added, and the mixture is filled into elastic capsules, each containing 0.5 Gm. of oleo-resin. The dose of 8 capsules is found very efficient.—Apoth. Ztg., Nov. 5, 1898, 777.

CARBASUS.

Medicated Gauzes—Preparation.—Fr. Gay gives a general formula for preparing medicated gauzes, of which the following formula for

Carbolated gauze serves as the type: carbolic acid, 30 Gm.; benzin (sp. gr. 0.7), 900 Cc.; ether, 100 Cc.; paraffin oil, 5 Cc.; absorbent gauze (0.7 meter wide), 10 meters. The gauze is cut into pieces of suitable size, immersed in the liquid, and strongly imbued with it by the aid of a pestle. It is then dried and enveloped in parchment paper. Thymol-, aristol-, and phenol-camphor gauze are made in the same way. Salicylic acid, salol, creosol, naphthol, betol, iodol, resorcin, picric acid, and corrosive sublimate gauze required the addition of 4 Gm. elemi to the solution otherwise prepared in the above proportions. To make

Iodoform gauze, 27.5 Gm. iodoform, 400 Cc. benzin, 600 Cc. ether, 10 Cc. paraffin oil, and 5 Gm. elemi are used to make the solution.

Dermatol gauze is made with 50 Gm. of dermatol and 5. Gm. elemi, using benzin, ether and paraffin oil in the proportions mentioned for carbolated gauze.—Pharm. Centralh., July 7, 1898, 488, from Bull. de Pharm. du Sud-Est.

CHARTÆ.

Stramonium Paper—Charta Antasthmatica.—Dursthoff has patented stramonium papers which are prepared by coating sheets of pure nitrocellulose paper with pulverized fresh stramonium leaves after the manner of making mustard leaves. It is more convenient, and said to be more efficient than the stramonium fumigations containing potassium nitrate that are commonly employed. He prepares it in sheets of 170x70 Mm., and containing about 2 Gm. stramonium, which may be cut into pieces of suitable size as needed. When ignited, it glows regularly and steadily, evolving a copious smoke that is found to relieve asthma very promptly. Owing to the convenient shape, these leaves may be carried on the person of the patient, and are then in reach at all times and places.—Pharm. Ztg., Oct. 15, 1898, 742.

Corrosive Sublimate Paper—A Convenient Substitute for the Tablets.—Paul Stern has introduced corrosive sublimate paper as a substitute for the corrosive sublimate tablets employed for disinfectant purposes. They consist of strips of paper, having a surface of 4x10 Cm., and containing 1 Gm. corrosive sublimate, 0.2 Gm. sodium chloride, together with some red

coloring matter. The advantages claimed are: rapid solubility; convenience to handle; facility to subdivide into smaller quantities—¼ or ½ Gm. of corrosive sublimate; permanence; prevention of mistake as to its poisonous character.—Apoth. Ztg., March 11, 1899, 127.

Test Papers—Formulas and Uses.—The following formulas from "Pharmaceutical Journal" are given here for convenient reference:

Potassium Ferricyanide and Citric Acid Paper.—These papers have the property of precipitating albumin from urine.

Wurster's Dimethyl-paraphenyldiamine Paper—(*Wurster's Red Ozone Paper.*)—Filter paper, impregnated with a solution of paraphenyldiamine. Indicator of ozone, sulphuretted hydrogen, etc.

Wurster's Tetramethyl-paraphenyldiamine Paper.—Filter paper impregnated with tetramethyl-paraphenyldiamine. Assumes an intense bluish-violet color in the presence of traces of active oxygen in neutral or acetic acid solution. Reagent for ozone and peroxide of hydrogen.

Reagent Paper (After Geissler and Oliver) for Detecting Albumin.—(a) *Picric and Citric Acids:* A precipitate results if a strip of paper is dipped into urine containing albumin. (b) *Sodium Tungstate and Citric Acid:* The presence of albumin, mucin, uric acid, peptones and creatinine is revealed by a precipitate resulting after strips of the above paper have been dipped into the urine.

Indigo Carmine and Sodium Carbonate Papers.—These papers furnish the Mulder reaction (a successive green, red and yellow coloration) in the presence of sugar in urine.

Griess Test Paper.—Filter paper saturated with an alcoholic solution of metaphenylenediamine. Gives a yellow to brown color reaction in the presence of nitrous acid and nitrites.

Griess Red Test Paper.—Filter paper saturated with an alcoholic solution of sulphanilic acid and alphanapthylamine hydrochloride. The presence of nitrous acid and nitrites produces a dirty-red coloration of the paper.

Palladium Chloride Paper.—Swedish filter paper saturated with a solution of palladium chloride. Reagent for coal gas, carburetted hydrogen, carbonic acid, etc., shows liberation of metallic palladium.

Phenol-Phthalein Paper.—Filter paper impregnated with an alcoholic phenol-phthalein solution, employed as indicator in alkalimetry.

Phloroglucin-Vanillin Paper.—Filter paper saturated with alcoholic solution of phloroglucin-vanillin, employed as a reagent for detecting the free hydrochloric acid of gastric juice.

Azolitmine Paper.—A reddish-violet bibulous paper impregnated with azolitmine. It is colored red by acids, blue by alkalies.

Lead Acetate Paper.—Filter paper saturated with a solution of neutral lead acetate, for detecting the presence of sulphuretted hydrogen.

Lead Glazed Papers.—Glazed paper impregnated with carbonate of lead, for detecting the presence of sulphuretted hydrogen.

Brasiline Paper.—Filter paper impregnated with a solution of indigo carmine, for detecting oxygen.

Red Carmine Paper.—Paper saturated with a solution of ammonia-carmine, an indicator of acids, giving a yellowish-red color reaction.

Curcuma Paper.—Filter paper saturated with an alcoholic tincture of turmeric. Indicator of caustic alkalies and alkaline earths, giving a reddish-brown color reaction. It is colored brown by boric acid, sulphur-yellow by acids. Sensibility for KOH about 1 : 180,000 ; for NH_2, 1 : 35,000.

Fuchsine Paper.—Paper saturated with an alcoholic fuchsine solution, employed for detecting sulphuric acid.

Dahlia Paper.—Filter paper impregnated with an alcoholic solution of the coloring matter of Dahlia variabilis. Indicator of acids and alkalies.

Hæmatoxylin Paper.—Filter paper saturated with aqueous solution of hæmatoxylin. Extremely sensitive indicator for ammonia, alkali, alkaline earths and certain metals.

Bilberry Paper.—Paper saturated with an alcoholic or aqueous extract of bilberries. Employed as an indicator of ammonia and fixed alkalies.

Blue and Red Litmus Paper.—Very sensitive indicators obtained by immersing filter paper in a neutral alcoholic litmus tincture. Sensibility of red paper for KOH, 1 : 20,000, of blue paper for HCl, 1 : 50,000.

Cobalt Paper.—Filter paper impregnated with cobalt chloride and methyl-blue solution. Indicator of zinc, copper and nickel.

Congo Paper.—Prepared by impregnating filter paper with a solution of Congo red. Turned blue by acids. Indicator of free acids.

Albumin Paper. — Paper impregnated with an aqueous solution of lacmoid. Obtainable in red and blue, and used in the same way as litmus paper. The red lacmoid paper is greatly superior to red litmus paper as an indicator of alkalies. It should be kept in a well-stoppered bottle, as it is very apt to spoil.

Methyl-Orange Paper.—Filter paper saturated with an aqueous solution of methyl-orange. Employed as an indicator of acids and alkalies. The methyl-orange paper is colored deep brownish-yellow by mineral acids.

Ozone Paper.—Potassium iodide starch paper. (Schoenbein's ozone paper.) Filter paper saturated with starch paste, which has previously been mixed with potassium iodide. Gives a blue reaction when ozone is present.

Thallium Paper.—Filter paper saturated with thallous hydrate. Gives a brown reaction when ozone is present.

Boettger's Test Paper.—Filter paper saturated with neutral gold chloride, colored violet in the presence of ozone.

Pole Test Paper.—Unsized paper saturated with an alcoholic solution of phloroglucin-vanillin. The paper, when moistened, turns red when applied to the negative pole of an electric current.

Silver Paper.—Filter paper impregnated with an aqueous solution of silver nitrate. Indicator of chromic acid, arsenous acid, etc. Delicate reagent for arsenic, specially suited for toxicological examinations.

Tropæolin Paper.—Filter paper impregnated with a saturated alcoholic solution of tropæolin. Gives a lilac reaction in the presence of free hydrochloric acid in gastric juice.

Potassium Mercuric Iodide and Citric Acid Paper.—Albuminous urine shaken with this paper gives a voluminous precipitate.—West. Drug., June, 1899, 275.

Cerata et Unguenta.

Cerates and Ointments—Japanese Wax a Substitute for Bee's Wax.—Robert C. Pursel calls attention to the value of Japanese wax as a substitute for bee's wax in the official ointments and cerates, which he prefers on the ground that while it perfectly replaces bee's wax, it is not liable to be adulterated, being about one-fourth as costly as the latter and easily obtained in pure condition, whereas bee's wax is, as is well known, often shamefully adulterated. The author has used it with advantage in the following preparations:

Simple Ointment: Japan wax, 15 Gm.; lard, 85 Gm.

Benzoinated Lard: Japan wax, 3 Gm.; benzoinated lard, 97 Gm. This is suitable for making ointment of zinc oxide.

Cold Cream: Spermaceti, 12.5 Gm.; Japan wax, 10.0 Gm.; expressed oil of almond, 62.0 Cc.; stronger rose-water, 19.0 Gm.; sodium borate, 0.5 Gm.

Tar Ointment: Tar, 50 Gm.; Japan wax, 10 Gm.; lard, 40 Gm.

Simple Cerate: Japan wax, 20 Gm.; lard, 80 Gm.

Camphor Cerate: Camphor liniment, 10 Gm.; Japan wax, 20 Gm.; lard, 70 Gm.

Cantharides Cerate: Cantharides in No. 60 powder, 32 Gm.; Japan wax, 12 Gm.; resin, 18 Gm.; lard, 28 Gm.; oil of turpentine, 15 Cc.

Spermaceti Cerate: Spermaceti, 10 Gm.; Japan wax, 25 Gm.; olive oil, 65 Gm.

Resin Cerate: Resin, 35 Gm.: Japan wax, 10 Gm.; lard, 55 Gm.

In most cases the resultant products were identical in appearance and other qualities with those made officially with bee's wax.—Amer. Jour. Pharm., May, 1899, 217–222.

Ointments—Presence of Living Organisms.—Prof. F. R. Eldred has tested the official ointments, carbolic acid, iodoform, iodine, mercuric oxide, and rose water; also lanolin, petrolatum, benzoinated lard and

simple ointment. Out of fifty different samples examined, thirty showed the presence of bacteria on moulds after the ointments had been kept for some time. The ointments giving growths when used for preparing cultures in the usual way, were the following: 5 per cent. carbolic acid, prepared cold or by fusion; 10 per cent. carbolic acid, prepared cold; ointment of carbolic acid, U. S. Pharm., three months old: 2 per cent. mercuric chloride; 10 per cent. iodoform. As to bases, fresh and rancid lard, lanolin, petrolatum and simple ointments all gave growths. It would appear from the author's experiments and results that most, if not all, of our ointments contain living organisms, and that heat alone does not completely destroy them unless the temperature be higher than 100° C.—Proc. Indiana Pharm. Assoc., 1898, 38–41.

Ointment Bases—Absorptive Power for Fluids.—Prof. Wilbur L. Scoville and J. T. Loftus record the results of some experiments made for the purpose of determining the absorptive power of different ointment bases for aqueous fluids, such as pure water or saturated saline solution likely to be used in prescriptions. The results are shown in the form of a table, as follows:

Ointment Base.	Water Per Cent.	Sat. Sol. Zinc. Sul. per cent.	Sat. Sol. L'd Ac'te. per cent.	Sol. L'd Subac. per cent.	50 per cent. Potas. Iod. per cent.	Sat. Sol. Sod. Chlo. per cent.
Lard	12 to 16	.....	.....	.....	.....	.....
Lard, with 5 per cent. wax	20	34	36.6	90.	30.	20.
Ointment, U. S. P.	29	37.5	25.	75.	40.	30.
Petrolatum	12 to 23	28.	23.5	22.	25.	27.5
White petrolatum	7.5 to 11	23.	15.5	15.	22.5	23.
Woolfat (average)	216	140	150.	212.5	185.	120.

In this table the per centages given are by weight. It should be borne in mind that while in many cases the per centage of salt solutions absorbed is greater than that of water, the volume of liquid absorbed may be smaller, owing to the density of the solution. It will be seen, however, that the presence of a salt in solution in most cases retards the absorption but little. The results obtained are in close agreement, as regards water, with those obtained by A. St. Onge, in 1896.—Amer. Drug., Dec. 26, 1898, 383–384.

A New Lanolin—Ointment Base—Formula.—Herbert Skinner recommends the following new ointment base: Lanolin soap, Anhydrous Lanolin, āā 15.0; Dist. Water, 60.0. The lanolin soap is liquefied in the water, the lanolin is added, and the mixture triturated until it becomes homogeneous. It must be preserved in air-tight containers. When applied to the skin, it produces, with a little water, an abundant lather, which effectively protects the surface, particularly at night.—Brit. Jour. Dermat., Oct., 1898.

Gelatin Ointments—Preparation.—Dr. Von M. Pelagatti calls attention to a new class of ointment bases which he designates by the general name "Salbenleim," literally "ointment glue," but preferably translated "gelatin ointments." They consist of a zinc gelatin mixed with lanolin or other fats and the desired medicament, the following being a typical formula: White glue (gelatin) 30.0; glycerin, 20.0; water, 50.0: pure lanolin, 48.0; zinc oxide, 20.0. The gelatin is dissolved in the glycerin and water by the aid of heat, and the previously prepared mixture of lanolin and zinc oxide stirred in, the mixture poured into molds when in the right condition for casting, and allowed to cool. Other medicaments, such as metallic mercury, resorcin, salicyclic acid, minium, cinnabar, etc., may be incorporated with the lanolin and added as indicated, or they may be incorporated direct with a previously prepared "lanolin gelatin."—Monatsh. f. prakt. Derm., 1899, 92.

Benzoinated Lard—Suggestions Concerning its Preparation.—That the official process for preparing benzoinated lard is not satisfactory becomes evident from the ever-recurring suggestion to modify or improve the process. Max Morris finds that by the official process the benzoin is incompletely extracted, the product is deficient in odor, and does not keep well. The process of dissolving the benzoin in ether, adding 10 per cent. castor oil to the filtrate, evaporating spontaneously, and using this in the proper proportion to benzoinate the lard is a good one. A simpler process, and one attended with more satisfactory results, is to heat the lard moderately, until it assumes a semi-fluid condition, add 90 grains of powdered benzoin to each pound of lard, stir well and allow to stand one week. Then melt the lard, and the benzoin will settle to the bottom of the container. The product is fine white in color, and contains the desirable components of benzoin. For summer use at least 6 per cent. of wax should be added to the lard.—Proc. Georgia Pharm. Assoc., 1898, 40–41.

Petrolatum (Vaselin)—Tests of Quality.—Feodor Miehle, discussing the unsatisfactory qualities of a commercial sample of "vaselin," (a term used by German pharmacists for commercial petrolatums), reviews the tests of the German Pharmacopœia for establishing their purity, and suggests the following modifications as being necessary to determine the neutrality and freedom from foreign oxidizable and odorous bodies:

Neutrality: If 5 Gm. of the melted "vaselin" are mixed with 5 Gm. chloroform, and the mixture is well shaken with 10 Gm. warm water, 1 drop phenolphthalein solution and 1 drop $\frac{N}{10}$ solution of alkali hydrate, a decided red coloration should be developed.

Permanganate Test: If 10 Gm. of the "vaselin" are heated with 5 drops of a freshly prepared 2 per cent. solution of potassium permanganate upon a water bath during a quarter of an hour, stirring continuously, the color of the permanganate should still appear distinctly red-violet.

Sulphuric Acid Test: If 10 Gm. of the "vaselin" are heated during a quarter of an hour, with stirring, upon a water-bath with 2.5 Cc. of a mixture of 15 parts concentrated sulphuric acid and 5 parts distilled water, neither the sulphuric acid nor the vaselin should assume a brown color.

In a table appended to the author's paper the degree in which different commercial samples of "vaselin" respond to these tests is shown.—Apoth. Ztg., Nov. 26, 1898, 830.

Carbolic Cerate—Formula for Hospital Use.—John A. Foote recommends the following formula for a carbolic cerate, which forms a good stimulating base, and is much used in the hospitals of the coal region of Pennsylvania:

Lard or petrolatum	2 lbs.
Yellow wax	8 ozs.
White wax	8 ozs.
Balsam fir	3 ozs.
Balsam Peru	1½ ozs.
Carbolic acid	3 ozs.

Melt the waxes by a gentle heat, and then add the lard (or petrolatum). Add the balsam fir and stir vigorously. Continue the stirring, and when partially cooled add the carbolic acid and the balsam Peru. Stir till cold. —Amer. Drug., Jan. 25, 1899, 37.

Carbolic Ointment—Modification of B. P. Formula.—Geo. Mack finds the new B. P. formula for carbolic ointment to be unsatisfactory. The glycerin readily separates and the carbolic acid may then exert caustic instead of local anæsthetic action. The paraffin basis, in fact, should be discarded as not suitable for the application of carbolic acid, and, in the author's opinion, a basis composed of 1 part of yellow wax and 4 parts of olive oil used. This gives a softer ointment than the United States Pharmacopœia formula, and has the advantage over the B. P. formula that all the ingredients are soluble in one another.—Pharm. Journ., Dec. 10, 1898, 629.

Unguentum Diachylon Album—Formula.—The following formula for preparing diachylon ointment is in use in the pharmacies of Berlin: Empl. litharg. simpl. (freed from glycerin), 10 p.: unguent. paraffini, 5 p.; paraffinum liquidum, 5 p.; aqua destillata, 1 p. The ointment is beautifully white, emollient, and does not become rancid as easily as that made by the official (Germ. Phar.) formula.—Pharm. Centralh., Dec. 22, 1898, 930.

Mercurial Ointment—Determination of Mercury.—Ivanhoe Ceruti recommends the following method for determining the mercury in ointment, which, he claims, gives particularly satisfactory results: 10 Gm. of the ointment are heated with 100 Gm. of clear vaselin oil to 100°, allowed to cool, and the oil is decanted. This is repeated twice successively with 50 Gm. of vaselin oil, after which the residual mercury is washed out with

benzin until the washings cease to produce a fatty stain on blotting paper. The results are stated to be accurate, but the special reasons for the preliminary treatment with vaselin oil are not apparent.—Pharm. Centralh., May 11, 1899, 297; from Boll. Chim. farmac., 1899, 7.

Mercurial Ointment—Advantageous Internal Use.—L. Silberman states that the internal administration of mercury in form of ointment has the advantage over other forms of metallic mercury in that it is absorbed better. He prescribes it in pills made as follows: Mercurial ointment with lanolin basis, 4.5 Gm.; powdered licorice root, 5 Gm.; glycerin, 5 drops; mucilage, sufficient to mass. Divide into 60 pills. In continental practice the treatment of syphilis with mercury in this form finds many followers. —Therap. Monatsh., xii, 397.

Unguentum Hydrargyri Oxydati flavi—Caution Against Dispensing in Earthen Jars.—Hans Benyschek cautions against the use of cheap glazed earthen jars so commonly in use by pharmacists in Germany for dispensing ointments. He had prepared a yellow oxide of mercury ointment, composed of 0.2 of the oxide and 10.0 of white vaselin, and dispensed it in a glazed jar. After a few days it was returned, the contents having become blackened throughout. Upon examining the glaze of the jar, it was found to contain manganese and lead.—Pharm. Post., 1899, 38.

Unguentum Zinci Oleatis, B. P.—Modification of the Official Manipulation.—George F. Merson offers some practical suggestions concerning the manipulation directed in the B. P. for preparing Unguentum Zinci Oleatis. He observes that notwithstanding that the amount of zinc sulphate (2 ounces) is largely in excess of the quantity required to decompose the hard soap (4 ounces), the decomposition of the latter is not complete when the official directions are followed "to dissolve the two separately in specified quantities of boiling water, and then to mix the solution." But if the two solutions are boiled a few minutes after mixing, complete interaction is effected, and the filtrate gives no indication of undecomposed sodium oleate. The designation "precipitate" as applied to the zinc oleate produced, also, is confusing, since instead of a precipitate forming, the zinc oleate rises to the surface as an oily layer, which slowly congeals to form a cake upon the surface of the fluid. If an attempt is made to wash the separated oleate before solidification takes place, considerable difficulty is experienced to prevent loss, while if washing is delayed till after concretion, the temperature of the "hot distilled water" directed is not sufficiently high to reliquefy the mass and thoroughly wash it. The most satisfactory method, the author finds, is to allow the separated oleate to solidify in the basin, pierce two holes in the cake, and drain out the aqueous fluid, rinsing the cake with a little cold water. Then heat with another portion of water, until the oleate is quite fluid, stirring briskly the while, again cool and drain as before. This may

be repeated once more, though it is scarcely necessary; the process is then completed as officially directed.—Pharm. Jour., Febr. 18, 1899, 140.

Green Lupus Salve—Formula.—Dr. G. P. Unna has employed the following salve with success in the treatment of lupus: Salicylic acid, solution of chloride of antimony, āā 2 Gm.: creosote, extract. cannabis ind., āā 4 Gm.; lanolin, 8 Gm. After applying the salve to the wounded surface, it is covered with plaster mull of zinc oxide, or simply with adhesive plaster.—Pharm. Centralh., Jan. 5, 1899, 14; from D. Medic. Ztg., 1898, No. 100.

Calendula Ointment—Formula.—Geo. M. Beringer communicates the following formula which yields a calendula ointment very similar to that sold by the homeopathic pharmacists: Petrolatum, 85 Gm.; yellow wax, 5 Gm.; paraffin, 5 Gm.; fluid extract of calendula, 5 Cc. Melt the wax, paraffin and petrolatum, add the fluid extract gradually and stir till cold. —Amer. Jour. Pharm., June, 1899, 269.

Ointment—A Good Formula for General Use.—A. E. Hiss recommends for the preparation of a stock ointment for cuts, burns, scalds, and skin diseases of all kinds, the following formula:

Carbolic acid	1 fluidounce.
Salicyclic acid	2 ounces av.
Ichthyol	2 ounces av.
White or Japan wax	2 ounces av.
Precipitated sulphur	10 ounces av.
Zinc oxide	10 ounces av.
Pine tar	10 ounces av.
Petrolatum	20 ounces av.
Oil of Rosemary, enough to flavor.	

—Bull. Pharm., Aug., 1898, 345.

Skin Cream—A Good Formula.—"Sam Bucus" recommends the following formula for a skin cream as producing a satisfactory preparation: Bruise 4 drachms of quince seeds, add to 42 ounces of water, bring to the boiling point, allow to stand twelve hours, and strain. Then add boric acid, 2 drachms: glycerin, 12 ounces; alcohol, 10 ounces; extract White Rose, extract Jockey Club, of each 4 drachms.—Bull. Pharm., June, 1899, 13.

Corn Salve—A Good Formula.—Frank Edel recommends the following formula for making a good corn salve: Salicylic acid, 2 drachms, extract of cannabis indica, 1 drachm; simple cerate, 2 ounces.—West. Drug., Dec., 1898, 547.

Casanthrol—A Casein and Coal Tar Ointment.—Dr. S. Beck recommends for the treatment of eczema in children, prurigo, etc., an inunction which has been introduced by Dr. Unna under the name of casanthrol. This is a mixture of casein ointment (see Proceedings, 1895, 626) with

10 per cent. of "extractum lithanthracis," the latter being the substance of coal tar, which is soluble in ether and benzol. It is a thick glutinous emulsion, which when applied to the skin forms a dry elastic coating in a few minutes, and which can be mixed with any medicinal agent that does not cause the casein to coagulate. Dr. Beck finds it to be without unpleasant after-effects, and that it is the only preparation of coal-tar which can be used, in a concentrated state, with good results on inflamed exuding skin.—Pharm. Post., Sept. 25, 1898, 451.

Sulphurated Zinc Paste—A New Dermatological Appliance.—Dr. Menahem Hodara recommends a paste for dermatological use, which is particularly recommended in cases where rapid drying and healing is desirable. It is prepared according to the following formula: Lanolin, vaselin, āā 20.0; glycerin, 10.0; sugar, 20.0; sulphur, 10.0; oxide of zinc, 20.0.—Apoth. Ztg., May 17, 1899, 281; from Monatsh. f. pr. Derm., 1899, 449.

Collodion.

Collodion—Substitution.—Lyman F. Kebler calls attention to a "cheap" collodion which has come under his observation. In odor, appearance and body the sample was good. The film did not appear to be abnormal, but on procuring a larger sample, the real nature of the substance was brought to light. The film at once proved to be abnormal, although the body and odor were good. On evaporating a small amount over a water-bath, the residue was found to be 28 per cent., while a normal collodion contains only three per cent. of residue. And what was the nature of this residue? It had a spongy feeling, sweetish taste (glycerin), and, when held in a flame, burned with much sputtering. The sputtering was probably due to some retained water. The odor of acrolein was very prominent. The residue was soluble in acetone, and in an ether-alcohol mixture. Insoluble in ether, alcohol, benzene and chloroform, The residue contained a waxy body and a little gun-cotton. On examining a portion of the distillate from this collodion, it was found to contain ether, alcohol and acetone.—Amer. Drug., Aug. 25, 1898, 97.

Collodion Substitute—Formula.—The "Bull. gén. de Thér." says that a substitute for collodion may be prepared as follows: Mastiche, 3 Gm.; balsam of tolu, narcotin, of each 1 Gm.; chloroform, 5 Gm. The solution so obtained may be spread upon muslin and used after the manner of the ordinary adhesive plaster, for covering and drawing together wounds, as well as for the local treatment of neuralgia and rheumatism.—Apoth. Ztg., May 6, 1899, 251.

Calendulated Collodion—Formula.—George M. Beringer, at the request of a physician, has prepared a calendulated collodion to be used as a substitute for isinglass and adhesive plaster. The formula is as follows: Calendula, in No. 20 powder, 100 Gm.; alcohol, a sufficient quantity; castor oil, pyroxylon, of each 20 Gm.; ether, 100 Gm. Percolate the

calendula with alcohol until 200 Cc. of percolate is obtained. To this add the ether, dissolve the pyroxylon in the mixture, add the castor oil and enough alcohol to make 100 Cc. and set aside a few days to clear.—Amer. Jour. Pharm., June, 1899, 269.

COLLYRIA.

Collyria—Preparation with an Oily Basis.—Prof. Pannas recommends purified olive or groundnut oil as a basis for eye-drops and lotions, considering them equally efficient and far superior in respect to the stability of the resultant preparation than when water or salves are used with the medicinal agent. The oils are purified by repeated treatment with alcohol to remove free fatty acids, and then sterilized at 120°. While the oils do not dissolve alkaloidal salts, they readily dissolve the free alkaloid, and solutions containing 1 or 2 per cent. are easily obtained, if necessary, by dissolving the alkaloid in ether and adding to the oil. In his experience the preparation may be kept for months in open vessels without deterioration.—Apoth. Ztg., Sept. 3, 1898, 620.

ELIXIRES.

Elixirs—Criticism of Several Formulas.—H. P. Hynson and H. A. B. Dunning report on several formulas proposed by the Committee on Pharmacy of the Maryland Pharmaceutical Association in 1897. They find that the formulas prepared for *Elixir of the Phosphates of Iron, Quinine and Strychnine* and for *Elixir of Pepsin, Bismuth and Strychnine* (see Proceedings, 1898, 670), are superior in every respect to the corresponding preparations of the "National Formulary," or to those obtainable by the formulas suggested in the various journals. In the first mentioned, the alkaloids, as well as the iron, are present as phosphates, and not, as in other cases, either uncombined or as sulphates or citrates; while in the Pepsin, Bismuth and Strychnine elixir, the pepsin is in a slightly acid medium, and not in an alkaline or about neutral medium prescribed in other formulas. By substituting pyrophosphate of iron for the phosphate prescribed in the formula recommended by the authors, an equally satisfactory *Elixir of Pyrophosphate of Iron, Quinine and Strychnine* is readily obtained, and having the marked green color so many prefer.—Proc. Maryland Pharm. Assoc., 1898, 71–74.

Elixir of Sulphate of Magnesia—Formula.—Dr. Herring has employed an elixir of sulphate of magnesia with much satisfaction during the last ten years, which he prepares as follows: Magnesium sulphate, 2 lbs.; sugar, 8 ozs.; water, 4 pints; oil of peppermint, 10 minims; fluid ext. gaultheria, tincture of cudbear, oil of cinnamon, of each 1 drachm. The dose of this elixir, which is quite palatable, is from a drachm to a fluid ounce, according to indications.—Proc. Kansas Pharm. Assoc., 1898, 45.

"*Liqueurs*"—*Various Formulas.*—"A. R." communicates the following formulas for preparing several popular "liqueurs":

Crème d'Absinthe.—125.0 Gm. of wormwood flowers, deprived of the stems, and the peel of 3 oranges, are macerated during 24 hours with 1.5 kg. of alcohol and 1.5 kg. of water, and then distilled so as to obtain 2 kg. of distillate. To this a solution of 1 kg. sugar in 1 kg. of water is added, and the "liqueur" is colored green with a suitable pigment.

Crème de Bergamotte.—5.0 Gm. of oil of bergamotte, dissolved in 2000 Gm. of alcohol, are mixed with a solution of 1500 Gm. of sugar in 500 Gm. of orange-flower water and 1000 Gm. of distilled water. The "liqueur" is colored yellow.

Crème de Menthe.—200 Gm. of fresh leaves of *Mentha crispa*, 2 kg. of the leaves of *Mentha piperita* and the peel of 4 lemons, are macerated with 3 liters each of alcohol and water during 24 hours, and distilled so as to obtain 4 liters of distillate. To the distillate a solution of 2 kg. of sugar in 2 kg. of distilled water is added, and the product is colored green.

Liqueur de Génévre.—125 Gm. of juniper berries, 25 Gm. of cassia buds, 15 Gm. of cloves, and 30 Gm. of coriander are digested with a mixture of 2 liters of alcohol and 2 liters of water, and then distilled so as to obtain two kg. of distillate, to which a solution of 1 kg. of sugar in 1 liter of water is added. This "liqueur" is colored yellow.—Apoth. Ztg., Sept. 17, 1898, 656.

EMPLASTRA.

Adhesive Plaster—Preservation.—Dr. A. Schneider, having about 11 years ago placed some spread adhesive plaster, loosely wrapped, into an exsiccator, and accidentally only discovered it very recently, found that it possessed its adhesive qualities unimpaired. He suggested, therefore, that its preservation over quick-lime may serve well for its preservation.—Pharm. Centralh., 1898, 935.

Belladonna Plasters—Popularity of the Ready-Spread (Rubber) Plaster.—John W. Ballard observes that while the official plaster is efficient, it does not supply the popular demand, being deficient in appearance, not sufficiently flexible, and uncomfortable to wear. The demand is for the ready-spread article with a rubber base, which seems to meet all requirements. The author makes some practical observations concerning their preservation, application, etc.—Proc. Iowa Pharm. Assoc., 1898, 46–48.

Cod-Liver Oil Plaster—Formula.—The following formula for a cod-liver oil plaster is given in "Revue Pharm.": Emplastrum Lithargyris, 300; Cera flava, 125; Oleum Jecoris Aselli, 175.—Pharm. Centralh., Sept. 22, 1898, 697.

EMULSA.

Emulsions and Emulsifiers.—A. E. Hiss has made an interesting study of emulsions, in order to determine the relative value of the numerous emulsifiers of fixed and volatile oils, stability of the product, and the

microscopic division of the oil globules. His conclusions are in part summarized as follows:

Tragacanth makes a much thicker emulsion than acacia, and may advantageously be added to the latter to give "body" to emulsions. It is not a satisfactory emulsifier for fixed oils, because the emulsion made by it is so very thick that it cannot be readily poured, and because the oil globules of the emulsion are too large. There is a marked difference between "commercial" and "pure" gum tragacanth as regards emulsifying power, the density of the product, and the size of the oil globules in the product. The pure gum makes a thicker emulsion, hence less of it must be used: and because less is used the product is more translucent, *i. e.*, less white, and the oil globules are larger. Tragacanth is therefore in general an uncertain and unsatisfactory emulsifier, and should not be used when anything better is to be had. It is superior, however, to acacia for making emulsions of volatile oils, because volatile oils are prescribed in relatively small proportions, so that but a small amount of emulsifier is required. If acacia be used, the excess of water, which would not be present in a fixed-oil emulsion, will separate out, while with the tragacanth emulsion this excess will be readily taken up by the emulsifier to form a moderately thick, non-separating emulsion. Tragacanth appears to reduce volatile oils to smaller globules than it does fixed oils.

Acacia is a satisfactory emulsifier, always quickly producing a white, uniform emulsion, unless there be a great preponderance of water or other liquid present. The oil exists in an acacia emulsion in a very finely divided state, and this, in the case of a fixed-oil emulsion, is quite a desideratum, as the oil should be in a condition to be readily absorbed in the alimentary tract. In the case of volatile-oil emulsions, acacia is less satisfactory, for reasons given above. It is necessary to use a pure gum, as any other will either fail to produce an emulsion at all, or, if produced, the emulsion will be dirty-looking instead of white, or will have some other fault

Acacia and Tragacanth in admixtures may be used for emulsifying, but such a mixture alone is not satisfactory. When to this mixture are added sugar and starch, however, as in the mixture called acamulsia, an excellent emulsifier for both fixed and volatile oils is obtained, the product which it produces being of fair consistency—neither too thin nor too dense.

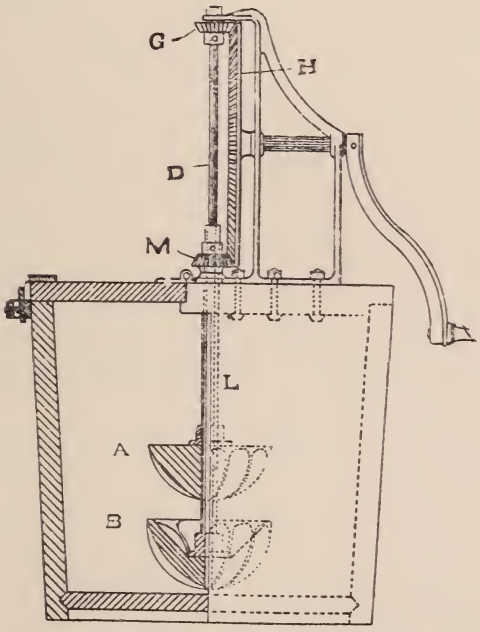
Saccharated Casein is the best emulsifier of all—superior even to acacia. It makes a thick, white emulsion which separates no more than an acacia emulsion. The taste is pleasant, and the oil globules are smaller than in acacia emulsions.

Condensed Milk is an emulsifier which may also be said to be superior to acacia. The emulsion does not separate, the oil globules are of about the same size as those of the acacia emulsion, and the taste of the emulsion is more agreeable than the latter.

Acacia has also this disadvantage as an emulsifier: it is a gum and therefore a colloidal substance, hence is not absorbed by the alimentary tract. Condensed milk and saccharated casein are, on the other hand, easily absorbed, because of their albuminous and saccharine character.—Bull. Pharm., June, 1899, 228–235.

Emulsions—A New Form of Emulsionizer.—John W. Otto has devised the churn and emulsionizer shown by Fig. 40. In it two dashers, *A* and *B*, of the same diameter, but one convex, the other concave, are given contrary motion by means of the large gear-wheel, *H*, which engages the two small ones, *G* and *M*. The convex dasher, *A*, is provided with a number

FIG. 40.



A New Form of Emulsionizer.

of wings, corresponding to a similar number of depressions in the concave dasher, *B*, and is mounted on the hollow shaft, *L*, bearing the gear-wheel, *G*, while the dasher, *B*, is carried by the vertical shaft, *D*, the latter being rotated by the gear wheel, *M*, fixed upon it. On rapid rotation, the contrary motion causes powerful currents in the fluid being treated, which rapidly effect the object in view.—Merck's Report., Aug. 1, 1898, 472.

Egg-Emulsions—Various Formulas.—L. Bernegaw highly recommends egg-yolks for preparing emulsions. These should, however, be prepared only as required, and if they are to be kept several days, should be placed into the refrigerator. They are most efficiently and conveniently pre-

pared with the aid of an egg-beater. Examples of egg-emulsions are given as follows:

Egg-Emulsion of Castor Oil—Vitellum Ricini.—Castor oil, 70.0; egg-yolks, No. 2; glucose, 10.0. Very pleasant to take.

Egg-Emulsion of Ferrous Iodide—Vitellum Ferri Iodidi..—Syrup of ferrous iodide, 25.0; egg-yolks, No. 4; glucose, 10.0. A substitute for cod-liver oil.

Egg-Emulsion of Calcium Hypophosphite—Vitellum Calcii Hypophosphorosi.—Syrup of calcium hypophosphite, 25.0; egg yolks, No. 4; glucose, 10.0. A good lime preparation for children.

Egg-Emulsion of Kola—Vitellum Kolæ.—Extract of kola, dry, 30.0; egg-yolks, No. 2; glucose, 10.0; cognac, 30.0. Dietetic stimulant and tonic.

The use of glucose in the foregoing formulas insures the permanance of the emulsification.—Apoth. Ztg., Oct. 12, 1898, 722.

Cod Liver Oil Emulsion with Glycero-Phosphates of Calcium and Iron —Formula.—The "Boll. Chim. Farmac." (1899, 69) gives the following formula for preparing an emulsion of cod-liver oil with the glycero-phosphates of calcium and iron: Calc. glycerino-phosph., ferr. glycerino-phosph., āā, 1.0; glycerin. puriss., 5.0; alcohol, 3.0; saponin, 0.05; aq. calcar., 10.0; ol. jecor. aselli. alb., 80.0; vanillin, dissolved in alcohol, q. s. The saponin is dissolved in a mixture of lime water and alcohol, the solution is emulsionized in a mortar, drop by drop, with the glycerin, and then the cod liver oil, previously intimately triturated with the glycero-phosphates, is gradually added. A handsome and permanent emulsion is thus obtained.—Apoth. Ztg., May 6, 1899, 251.

Bromoform Emulsion—Formula.—The following formula for bromoform emulsion is recommended in "Nouv. Rém." (1898, 547): Bromoform, 3.5; oil of sweet almonds, gum arabic, āā, 30.0; cherry laurel water, 10.0; syrup of orange flower, 40.0; distilled water, sufficient to make 300.0 grammes. The almond oil is mixed with the bromoform and emulsionized with the gum arabic and sufficient water, after which the other ingredients are added. Each teaspoonful contains 2 drops of bromoform.—Apoth. Ztg., 1899, 10.

EXTRACTA.

Extraction of Drugs—Use of Acetic Acid as a Substitute for Ethyl Alcohol.—Dr. Edward R. Squibb throws some further light on the value of acetic acid as a substitute for ethyl alcohol in extracting the active principles of drugs, a subject first introduced by him in 1893 (see Proceedings, 1893, 418). In the proposed substitution the very first question is as to the therapeutic equivalency of the preparation obtained. If, for instance, it can be shown that the necessary amount of acetic acid in fluid extracts, etc., is therapeutically objectionable, or more objectionable than the necessary amount of alcohol, then it is not proper to make the substitution.

But acetic acid, the author observes, has long been used for the extraction of cantharides, colchicum, ipecacuanha, opium, squill, etc., without developing any known therapeutical objections, and in a limited experience in the extraction of spices, and of some drugs for veterinary use, it gives extracts practically identical with those from alcohol. The properties and value of acetic acid as an antiseptic, detergent and preservative are well known, but whether it would be present in sufficient proportion to preserve such preparations from change during a long time has not yet been determined. The oldest set of samples, made with 10 per cent. acid, are now about two years old and apparently unchanged. Fluid extract of ergot, by the official process, is preserved by acetic acid in small proportion, as first proposed by Prof. Wm. Procter, Jr., in 1857, and in that case an alcoholic preparation very liable to change has been made permanent. Fluid extracts made with acetic acid are much more loaded with inert extractive matter than those made with alcohol, but they possess the advantage over the latter in being less liable to precipitate on dilution, and in their precipitations, if formed, being more soluble and less liable to contain much of the active constituents.

From these and other considerations it is claimed that there are no serious therapeutical nor administrative objections to a more extended and more general trial of this proposed substitution, especially by the pharmacopœial authorities through the Research Committee. Dr. Squibb gives in detail the experiments made in order to measure with a fair degree of accuracy the comparative capacity of alcohol and acetic acid for extracting the active principles of drugs. Selecting nux vomica as one of the most difficult drugs to extract, parallel extractions were made by the author's well known process of repercolation under the same conditions at the same time, the nux vomica being of the same lot of 2300 pounds, one-half of which was coarse powder (No. 9), the other half of the coarse powder being reduced to fine (No. 60) powder, and each portion assayed. The fine powder, assaying 2.80 per cent. of mixed alkaloids (= 42 Gm. in 1500 Gm.) was employed for the percolation with the alcoholic menstruum of the United States Pharmacopœia; the coarse powder, assaying 2.93 per cent. of mixed alkaloids (= 43.95 Gm. in 1500 Gm.) was used for the percolation with acetic acid. The results are given in two tables, the one showing the rate of exhaustion until this was absolute, the other the practical application of the results. This second table, which is here reproduced, deals with the percolate in groups of five fractions each, the measures being made up to 500 Cc., and assayed for measure and weight of fraction—for total extract—for chloroform extract and for total of mixed alkaloid. The most significant showing of this table, and the most important to the proposed substitution is, that in the first three lines of the table the alcoholic menstruum has extracted 85.3 per cent. of the total alkaloids present, while the acetic acid menstruum has extracted 89.8 per

cent.; and that in the fifth line the amount of alkaloids *not* extracted is as 91 for the United States Pharmacopœia menstruum against 27 for the acetic acid menstruum.

NUX VOMICA REPERCOLATION.

Three Successive Portions of 500 Gm. each for each Menstruum.

500 Gm. Portions.	500 Cc. Percolate.	U. S. P. Menstruum.				Acetic Acid Menstruum. (10 per cent. Acid.)			
		Weight. Gm,	Extract. Gm.	Chloroform Extract. Gm.	Alkaloids. Gm.	Weight. Gm.	Extract. Gm.	Chloroform. Extract. Gm.	Alkaloids. Gm.
1st Portion.	1st. 500 Cc.	457.76	54.80	15 50	10.56	551.20	78.00	12.00	11.19
2d " .	1st. 500 Cc.	463.88	60.00	17.50	12.01	538.10	104.00	16.00	13.74
3d " .	1st. 500 Cc.	471.05	72.50	20.00	14.74	539.69	104.80	21.00	14.65
" " .	2d. 500 Cc.	454.38	30.50	9.50	5.46	521.80	51.50	9.50	4.20
" " .	3d. 500 Cc.	443.36	2.50	1.00	0.91	508.36	4.00	0.50	0.27
" " .	17th Fraction.	88.65	0.40	0.16	0.07	101.70	0.48	0.08	0.06
		Original Assays.			43.75 42.00				44.11 43.95

The weighing and measurements of the first three columns of the table are actual upon the scale of the figures given. Those of the other columns were on portions of 10 Cc. of percolate. Evaporation to constant weight gives the extract. The chloroform extract was ascertained by shaking out the solution of the dry residue in water and ammonia with chloroform and ether mixtures. The alkaloid was ascertained by titrating the chloroform extract with decinormal acid.

It will be seen by the table that the first 500 Cc. of the third 500 Gm. of both powders give a fluid extract that represents cubic centimeter for gramme, but 100 Cc. of these will contain 2.8 Gm. of mixed alkaloids instead of 1.5 Gm. as prescribed by the United States Pharmacopœia for its fluid extract. Both fluid extracts are dark brown liquids, that made with alcohol being slightly darker, and both, after six weeks' standing, were bright and clear, but the alcohol extract had a small gray deposit. As a broad general result, it is claimed that by the substitution of the acetic acid menstruum for the alcoholic, one-half the cost of grinding, and five-sixths of the cost of menstruum are saved, an equivalent product being obtained in large quantity. Actual experience in the use of preparations made with the new menstruum is as yet not large. But considerable quantities of fluid extracts have been made and supplied for veterinary practice, and from numerous letters received, no drawbacks have yet been discovered in a list embracing all of the more important preparations As to the name to be applied to this class of preparations, in case they should be adopted into the United States Pharmacopœia, Dr. Squibb thinks it all

sufficient to place conspicuously after the official title, the words "Made with Acetic Acid."

In concluding his paper the author gives the details of an assay process for the acetic preparation of nux vomica, being a modification of that of the United States Pharmacopœia, consisting chiefly in substituting chloroform-ether mixtures for chloroform alone in the shaking-out process, and in giving explicit details as to some of the manipulations necessary to the successful assay.—Amer. Jour. Pharm., Jan., 1899, 1–14.

Extraction of Drugs—Use of Acetic Acid and other such Cheap Solvents.—Stedem records the results of experiments made with acetic acid, of 40 per cent. absolute acid strength, for the extraction of drugs. Using 250 Gm. of ergot, it was exhausted with 500 Cc. of the menstruum and yielded 100 Gm. of the extract; 500 Gm. of gentian required 1200 Cc. of menstruum, and yielded 380 Gm. of extract; 500 Gm. of belladonna (leaves [?], Rep.) required 1000 Cc. of menstruum, and yielded 210 Gm. of extract; and 500 Gm. of cascara required 1000 Cc. of menstruum and yielded 250 Gm. of extract. The extracts so produced are not only cheaper, but seem to possess qualities that make them otherwise desirable. They do not harden, and do not mold. The slight odor of acetic acid retained by these extracts does not interfere with their use. Extract of ergot readily furnishes a clear solution, and may therefore be advantageously used for hypodermic solutions. The extract of belladonna has all the qualities that can be desired. In each instance, the residues after extraction with acetic acid were tested, and found to be completely deprived of active constituents. The author has also prepared the tincture of deodorized opium and oleoresin of cubebs with advantage with petroleum benzin instead of ether.—Proc. Pa. Pharm. Assoc., 1898, 116–117.

Extraction of Drugs—Increasing Popularity of Percolation in Germany.—Although the process of extracting vegetable drugs by percolation or displacement originated, as is well known, on the continent of Europe many years ago, it has until recent years found very little application for this purpose in pharmacopœial processes in Germany, and the process was but imperfectly appreciated and understood by the average German pharmacist. With the introduction of fluid extracts into the German Pharmacopœia (Arzneibuch), however, the attention of German pharmacists was, by necessity prominently drawn to the process, and "percolation" has been the subject of numerous papers, either in direct reference to the technical features of the process or in its application to the preparation of fluid extracts. An excellent article on "The technic of percolation" has now been published by Willy Wobbe, which, while presenting the subject in an interesting manner, gives nothing that is new to the American pharmacist, the salient points being fully exploited in the United States Pharmacopœia, as well as in the usual works of reference. Moreover, it cannot be profitably abstracted, and must therefore be consulted by those

interested either in the original or in full translation, if such should appear. It is gratifying, however, to note that a process which has so long been understood and appreciated by American pharmacists, should, after years of opposition or indifference, meet with that attention by foreign pharmacists which its advantages over the older methods of extraction so well deserve.—Apoth. Ztg., May 27, 1899, 312–314.

Scale Extracts—Preparation and Advantages.—Dr. A. B. Lyons, about a year ago, conceived the idea of giving to vegetable extracts the scale form, thus making it possible to dry them thoroughly, either without heat or by the aid of a current of slightly warmed air. It was found practicable in most cases to prepare thus an extract four times the strength of the crude drug, and it seemed best to adopt this uniform standard of strength, except for extracts which have been heretofore made of a definite alkaloidal strength. The end in view is secured by preparing a highly concentrated extract of the drug by the use of menstrua which leave behind as much as possible inert constituents, and then add sufficient acacia to bring the product to a definite standard of strength. The thin extract is spread on glass plates and dried in an air current, as is usual in making scale preparations.

The advantages of scale extracts, which are already competing in the market with the equally unofficial powdered extracts are these:

1. They are not subjected to any prolonged or excessive heating in the process of manufacture, and therefore are more likely than the powdered extracts to retain unimpaired the full efficiency of the drug they represent.

2. They are much less hygroscopic than the corresponding powdered extracts, so that under reasonable care they can be kept indefinitely without caking together. In case they should cake, it is a very easy matter to restore them to their original condition. They may be dissolved in a little warm water, spread on glass and scaled again, with very little trouble.

3. They are attractive in appearance, containing comparatively little of the inert matter which renders the ordinary solid extract so unsightly.

4. They are definite in strength, corresponding as nearly as possible with the best standards for ordinary extracts. Where there is no standard, these preparations are made uniformly four times the strength of the crude drug.

5. The ordinary solid extract may segregate into portions differing materially in strength (this has been shown to occur in extract of belladonna), and variations in strength from evaporation or absorption of moisture defeat the attempt to bring them to a fixed standard. The scale extracts are of necessity homogeneous and not liable to any material change from gain or loss of moisture.

6. The scale extract serves even better than the ordinary solid extract as an excipient for pill masses, requiring only addition of a very little

water, or sometimes preferably of glucose or syrup, to form a plastic pill mass.—Pharm. Review, Jan. 1899, 12–14.

Green Narcotic Extracts—Process of Assay and Standardization.—W. A. H. Naylor and John J. Bryant record the results of experiments made upon the green extracts of belladonna and of hyoscyamus, from which they conclude that there is no difficulty in making green extract of belladonna to contain 1 to 1.25 per cent. of alkaloid and green extract of hyoscyamus 0.2 per cent. of alkaloids. The average percentage obtained in the case of ten samples of the belladonna extract was 1.2142 per cent., and in the case of hyoscyamus extract 0.3393 per cent., the process of assay employed and recommended being as follows: From 2 to 5 Gm. of of the extract is weighed into a wide-mouth flask, 25 Cc. of 90 per cent. alcohol is added, and the flask with its contents heated for a time on a water-bath under a reflux condenser. After cooling, the alcoholic solution is filtered off, and the residue is treated twice successively in the same way with the same quantities of alcohol. In practice this treatment has been found insufficient to completely transfer the alkaloidal contents of the extract to the alcohol, but this may be verified in each assay by warming the residue in the flask with a 5 per cent. solution of hydrochloric acid, filtering, and testing the filtrate with iodine-potassium iodide. The united alcoholic filtrates obtained as described are diluted with an equal volume of a 5 per cent. solution of hydrochloric acid (B. P.), and the mixture is shaken out three times successively with 15 Cc. of chloroform, rejecting the chloroformic solutions. The acid solution is then rendered distinctly alkaline with ammonia water and shaken out three times successively with 10 Cc. of chloroform. The chloroformic solutions so obtained are evaporated together and the residual alkaloid is dried to constant weight on a water-bath. The result may then by confirmed by titrating the dry alkaloid by the process directed in the British Pharmacopœia, the difference between the gravimetric and volumetric results under these conditions being in the experience of the authors less than 0.01 Gm.—Proc. Brit. Pharm. Conf., 1898, 359–364.

Solid Extracts—Indefinite Designation of Consistence.—L. V. Itallie observes that the customary designations defining the consistence of solid extracts, such as "thick" or "thin," etc., admits of too great a latitude for the percentage of water they may contain, a matter of considerable importance in the case of narcotic extracts in particular. Accuracy demands a more definite designation. The proposition of Dieterich to arrive at a definite composition of solid extracts by determining the specific gravity of a solution of 1 part of the extract in 2 parts of water, does not give figures of sufficient practical value. He is of the opinion that the amount of extract should have some definite relation to the drug, or that the final amount of extract should bear some definite relation to the abso-

lute amount of dry substance contained in it.—Apoth. Ztg., Sept. 7, 1898, 629; from Pharm. Weekbl., 1898, 28.

Extract of Ginger—Use of Acetone as a Solvent.—In the course of experiments to produce extract of ginger that would contain the whole of the flavoring and odorous principle, T. H. W. Idris found that acetone was the most suitable solvent, boiling as it does at 56° C, and being miscible with water in all proportions. The apparatus used consisted of a modification of a Soxhlet on a manufacturing scale. The acetone extract does not appear to have lost any of the volatile oil in the process of recovery, as is so markedly the case when using alcohol. It is a dark brown substance of a treacly consistency, intensely pungent, possesses the full aroma of the ginger employed, and is readily soluble in alcohol, forming a deep brown liquid. The various tinctures and essences of ginger may be very conveniently and efficiently prepared from this extract, and syrup may be flavored with it by proper diffusion at a suitable temperature without the use of any spirit.—Proc. Brit. Pharm. Conf., 1898, 384–385.

Extract of Strophanthus—Quick Method of Determining the Percentage of Strophanthin by Means of the Polariscope.—See *Strophanthin*, under "Organic Chemistry."

EXTRACTA FLUIDA.

Fluid Acetracts—A New Class of Preparations.—Joseph P. Remington proposes the term fluid acetracts to a class of fluid extracts prepared with acetic acid, more or less diluted, as exclusive menstruum and preservative, and records his experience concerning their advantages and keeping qualities.

Fluid Acetract of Sanguinaria, prepared by extracting the powdered drug with a 60 per cent. acetic acid, has kept perfectly, not showing the slightest sign of a precipitation, though kept for five years, and representing the drug Cc. for gramme. Made with diluted acetic acid it forms an abundant precipitate.

Fluid Acetract of Ipecacuanha. A 60 per cent. acid seems to be required for this, since with a weaker acid it shows a tendency to gelatinize. It has kept well for two years, showing no precipitation. On the other hand,

Fluid Acetract of Ergot may very successfully be made with a 10 per cent. acetic acid menstruum. One fact is noticeable, however, the tendency of light colored fluid acetracts to darken with age.

Fluid Acetract of Squill (strength of menstruum not stated), was of a light amber color when made ten years ago; it now has become dark red, though remaining clear. The author also submitted for inspection at the pharmaceutical meeting at which his paper was read, a series of nine fluid extracts made in the laboratory of Dr. Squibb by the process of repercola-

tion. These represented some of the most important official drugs, viz., digitalis, cascara sagrada, aconite root, nux vomica, belladonna leaf, compound gentian, gelsemium and coca. The efficiency of these preparations remains to be determined in practice, the presence of large quantities of acetic acid being a possible objection. In the observation at the Squibb laboratory, drugs may be extracted with diluted acetic acid in a much coarser condition than when other menstrua are used.—Amer. Journ. Pharm., Nov., 1898, 543–545.

See also under "Extracta."

Fluid Acetracts—Comparison with Fluid Extracts.—Wm. B. Thompson observes that where radical change in the method of preparing medicines is advocated or proposed, we cannot be expected to accept any statement of facts, however responsible or authoritative, without some reservation. The theory may be indisputable, and the deductions upon which that theory is based incontrovertible, yet when determinate or conclusive evidence is not before us we must insist upon practical demonstration. There has been submitted to the trade judgment a class of fluid pharmaceutical preparations to which the term "Acetracts" has been very aptly applied, all these being of an acetous character. The first impression is that there is presented in these fluid "acetracts" a method of procedure and result which completely revolutionizes all former conclusions and absolutely deranges all previous theories as to what constitutes the best general solvent for all these varied, complex constituents of drugs. Experience and practice extending over an unlimited period of observation in pharmacy has apparently fixed and confirmed the value of alcohol, in varying proportion with aqueous media, as being the true and only known natural solvent for all the useful vegetable matter with which the active medicinal principles are allied in drugs. In the "acetracts" we have a watery solvent containing more or less acetic acid, and it behooves us to inquire into something more than the comparative amount of extractive and the keeping qualities, before we can decide as to the merits of the fluid acetracts over fluid extracts prepared with alcoholic menstrua. This is the drift of Mr. Thompson's preliminary remarks, introducing a comparative, although casual, examination of a number of fluid acetracts and the corresponding fluid extracts. The comparisons do not speak very favorably for the fluid acetracts, in so far as sensible properties, color, odor, taste, consistency, etc., are concerned, though, in the absence of chemical or therapeutic experiments, they are by no means to be considered conclusive. The fluid acetracts and extracts examined were those of cotton root bark, coca, cascara, buchu, digitalis, gentian comp., ergot, aconite root and belladonna root.—Am. Jour. Pharm., Feb., 1899, 67–71.

Fluid Extracts—Acetic Acid as Menstruum.—In 1889 Prof. Frederick J. Wulling made a series of experiments with a view to testing the value of acetic acid in the preparation of fluid extracts and extracts. Fluid ex-

tracts of the following drugs were made by percolation (after previous maceration), employing as menstrua 4 per cent., 6 per cent., 10 per cent., and 20 per cent. acetic acid :

Aconite-root,
Belladonna leaf,
Coca,
Nux Vomica,
Opium,
Gelsemium,
Gentian,
Hyoscyamus,
Digitalis,
Sanguinaria,
Hydrastis,
Ipecac,
Squill,
Colchicum Seed,
Cinchona.

Most of these fluid extracts have been kept since in small, well-stoppered bottles. Of these nearly all made with the 4 per cent. acid soon after deposited sediment, or gelatinized, or deterioriated otherwise. Those made with 6 per cent. acid (diluted acetic acid), with the exception of ergot, sanguinaria, gentian, senega and ipecac (most of which have gelatinized—sanguinaria soon after precipitated copiously), are apparently in a very good condition. Among those made with ten and twenty per cent. acid, all but sanguinaria, senega and ipecac are free from precipitates and are fine-looking preparations. Sanguinaria, senega and ipecac gave no satisfactory preparations with any acid up to twenty per cent. strength. In the opinion of the author, not all, but many drugs, yield with dilute acetic acid as menstruum eligible pharmaceutical preparations capable of replacing alcoholic fluid and solid extracts. Ergot requires a 10 per cent. acid, ipecac a 50 per cent., and sanguinaria a 55 per cent. acid for the preparation of permanent acetic fluid extracts.—Pharm. Era, Dec. 15, 1898, 796.

Fluid Extracts—Preparation with Lactic Acid.—Referring to the proposed introduction of extracts and fluid extracts (which see), E. Marpmann calls attention to the superior value of lactic acid for the purpose of preparing vegetable extracts, since it is readily borne upon the stomach when acetic acid, or even citric acid, is contraindicated. He has in this way prepared, since 1887, a

Fluid Extract of Ergot, using a menstruum containing 1 per cent. of lactic acid and 10 percent. of alcohol, and operating by the repercolation process recommended by him in 1888 (see Proceedings, 1889, 336). The fluid extract so obtained has been used with advantage in a number of hospitals, where it is preferred to those prepared in the ordinary way.—Pharm. Centralh., Dec. 8, 1898, 883.

Fluid Extracts—Recommendations Concerning their Preparation.—J. H. K. Smeets communicates in "Pharm. Weekblad" (1898, No. 31 and 32) the conclusion arrived at after a comprehensive study and experiments in the preparation of fluid extracts. In the main, he says very little that is not familiar to the American pharmacist. It is significant

only that the author appears to recognize the American methods of preparing these preparations in their true value. In order to secure a fluid extract that shall represent the drug gramme per cubic centimeter in an unchanged condition, he strongly favors the process of repercolation, and for this purpose describes a method adapted to their preparation on a small scale. He advises that all powders for percolation should be thoroughly dried at 30° C., and should have moderate but uniform fineness, a sieve with 30 meshes to the □ centimeter answering well. Taking

Fluid Extract of Hydrastis as an example, he finds that the drug may be practically exhausted by three parts of percolate from one part of drug. Obtaining successive portions of 250 Gm. from 250 Gm. of the powdered drug containing 2.84 per cent. of hydrastine, the first portion yielded 4.765 Gm., the second 1.542 Gm., the third 0.491 Gm. of hydrastine, while the subsequent percolates gave only reactions. Applying to the drug the process of repercolation, he obtained a fluid extract of a brown yellow color, clear, of sp. gr. 0.965 to 0.975, and yielding 20 per cent. of dry extract.—Apoth. Ztg., April 5, 1899, 179.

Fluid Extract of Hydrastis—Composition of the Deposit Formed on Standing.—O. Linde has subjected the precipitates formed in fluid extracts of hydrastis on keeping to chemical examination. He finds these precipitates to be variable in their composition. They are composed mainly of berberine and hydrastine, while phytosterine is contained in them only in small proportions. It is noteworthy in consideration of the ready solubility of the salts of hydrastine in water, that this alkaloid should be found in these precipitates. This can be accounted for only on the ground that the alkaloid is present in the free state—at least in part—in the fluid extract, the free alkaloid requiring 120 per cent. of 96 per cent. alcohol and 220 per cent. of diluted alcohol for solution. That this may be the case, has already been pointed out by A. Dohme and H. Engelhardt in 1895 (see Proceedings, 1896, 591), and Mr. Linde now confirms this observation by an examination of both the rhizome and the fluid extract. He found in three samples of fluid extract 55.5, 54.55 and 49.68 per cent. of the total hydrastine to be in the free alkaloidal condition, while in two samples of the rhizome the percentages of free alkaloid in total hydrastine were 54.7 and 45.3 per cent. respectively. The total hydrastine—free and combined—was as follows: In the rhizome, 2.285 and 3.598 per cent.; in the fluid extract 1.92, 2.97, and 2.355 per cent.—Arch. d. Pharm., 1898, 236, No. 9, 696–701.

Fluid Extract of Hydrastis—Assay of Hydrastine.—N. Rusting recommends the following method for determining the hydrastine in fluid extract of hydrastis. The general process is that advocated by the author for the assay of alkaloids (which see under "Organic Chemistry"): To 10 Gm. of the fluid extract 20 Gm. of water are added, the mixture is

boiled with continuous agitation until *all* the alcohol is dissipated, cooled, brought to the weight of 20 Gm., shaken with a little infusorial earth (less advantageously with talc), and filtered. Then, 10 Gm. of the filtrate (representing 5 Gm. of the fluid extract) are shaken in a 100 Gm. flask with 25 Cc. of ether and 3 Cc. of ammonia. After a few minutes, 25 Cc. of petroleum ether are added, the mixture is well shaken and 2 Gm. of powdered tragacanth are added, as described in the before mentioned general process. The mixture is allowed to stand until the ethereal solution separates clear, and 40 Cc. of it are decanted into a small flask, from which about 25 Cc. are evaporated or distilled by immersion in warm water. The flask is then slightly stoppered and set aside in a cool place, so that the hydrastine may crystallize out completely. The supernatant liquid—consisting mainly of petroleum ether, and which is free from hydrastine—is decanted, and the residual crystals are dried and weighed as hydrastine.—Pharm. Centralh., Nov. 3, 1898, 787.

Fluid Ext. of Belladonna—Direct Process of Assay.—W. A. Puckner describes several experimental methods for the direct assay of fluid extract of belladonna by modifications of Keller's method, designed to avoid evaporation of the fluid extract. The three methods tried give, on the whole, identical results, and are equally convenient, but the somewhat greater purity of the alkaloid obtained by a method which the author describes as Method C, and the greater economy in material, leads him to prefer that method, which is as follows: Measure 10 Cc. of the fluid extract into a separator and add 10 Cc. of water, 20 Cc. of chloroform, 2 Cc. of 10 per cent. ammonia water, and shake thoroughly. When the two layers have separated completely, draw off the heavier, receiving it in a separator: complete the extraction of the alkaloid with two further portions of chloroform, 10 Cc. each, adding this to the chloroform solution first drawn off. Shake the chloroform solution of the alkaloid with 20 Cc. of 1 per cent. hydrochloric acid, and when separation has occurred draw off the chloroform into a clean separator, using a few Cc. of chloroform to remove the portion remaining in the stopcock and outlet of the first, and again shake the chloroform with 1 per cent. hydrochloric acid, using only 10 Cc. this time. Draw off and reject the chloroform and add the last acid extract to that in the first separator, using a few Cc. of water to complete the transfer. To the united acid solutions add a few Cc. of chloroform, draw off and reject the same, and now add chloroform 20 Cc. and ammonia water 2 Cc. and shake well. Draw off the clear chloroformic solution; complete the extraction with two further portions of chloroform, 10 Cc. each. Evaporate the chloroform and titrate the residue as follows: Add to it about 5 Cc. of ether, about 5 drops of cochineal test solution and gradually a slight excess of $\frac{N}{20}$ acid; when complete solution has taken place and the ether has evaporated, determine the excess of acid with $\frac{N}{20}$ alkali. Each Cc. of acid is taken to represent 0.01442 Gm. of alkaloid.—Pharm. Review, Aug., 1898, 303–308.

Liquid Extract of Belladonna, B. P.—Modification of the Assay Process of 1898.—One of the most troublesome features of the method of assay prescribed in the B. P. for the determination of the alkaloidal strength of liquid extract of belladonna, is the emulsification which takes place on shaking the alkaline liquid with chloroform. F. C. J. Bird finds that this tendency is completely overcome if the fatty and resinous bodies contained naturally in the liquid extract are removed preliminarily by shaking the acidified extract with chloroform, the following quantities having been found to work well in conjunction with those given in the B. P. process: liquid extract of belladonna, 10 Cc.; water, 40 Cc.; diluted sulphuric acid. 10 Cc.; chloroform, 20 Cc. Agitate thoroughly, warm the mixture over a steam bath until as hot as the hand will bear (this facilitates the separation of the chloroform) and separate. Wash a second time with 10 Cc. of chloroform, and again separate. Now shake the united chloroform solutions with a mixture of 1 Cc. of diluted sulphuric acid and 4 Cc. of water, add the washings to the aqueous liquid, rejecting the chloroform. The aqueous liquid is then made decidedly alkaline with ammonia and shaken out with chloroform, warming the mixture to facilitate separation, the process being completed as directed in the Pharmacopœia. Concerning the final titration of the alkaloid obtained, for which the B. P. directs that decinormal soda solution and decinormal hydrochloric acid be used, with cochineal as indicator, the author gives preference to $\frac{N}{50}$ soda and hydrochloric acid, and methyl orange as being preferable to cochineal because, while less sensitive, it possesses the advantage of being unaffected by CO_2, likely to be present in soda solutions as ordinarily prepared. Certain precautions are necessary, however, if absolutely concordant results are desired. Its sensitiveness depends on the neutrality of the indicator itself, on the amount of indicator used, and on the degree of dilution of the free acid and alkali present. The latter is provided for by the use of $\frac{N}{50}$ solution; the indicator should be added in the proportion of 1 drop to each 15 Cc. of liquid. In connection with this paper the author describes and figures a convenient arrangement for the storage and continuous supply of the soda test solution, which see under "Inorganic Chemistry."—Pharm. Journ., May 13, 1899, 432–435.

Liquid Extract of Ipecacuanha, B. P. 1898—Improved Assay Process.—Harold Wilson, on trying the assay process of the B. P. 1898, on a sample of liquid extract of ipecacuanha, was struck by its complexity, and by the length of time required for its completion. This is principally due to the requirement of using lead subacetate for the removal of components that are supposed to interfere with the subsequent shaking out of the alkaloids; but experiments made by the author show that this is not alone unnecessary, but that the lead compound carries with it also a small amount of the alkaloid, and to this extent renders the results inac-

curate. As a further result of his experiments, he suggests the following method of assay, which is simpler, quicker and more accurate than that officially given:

Take 20 Cc. of the strong liquid extract, dilute with 20 Cc. of water, place in a porcelain dish and dissipate the alcohol by evaporating the mixture to rather less than half the bulk; allow to cool. Now add 1 Cc. dilute sulphuric acid and transfer to a separator, washing the dish with 20 Cc. of water and adding these washings to the liquid in the separator. Add 10 Cc. of ether-chloroform (ether and chloroform equal volumes), agitate, warm to promote separation; run off and reject the ether-chloroform layer and twice repeat the treatment with the same quantity of ether-chloroform. Add now 10 Cc. of ether-chloroform, followed by an excess of solution of ammonia, agitate, warm, and run off the separated ether-chloroform layer into a tared dish; agitate with two more similar quantities of ether-chloroform, separate as before, and add to that in the tared dish. Then evaporate the mixed solutions and dry the residue at below 80° C., to constant weight. The only tedious part of this process is the drying to constant weight at 80° C.; but this cannot be shortened because of the possible loss of cephaëline, as shown by Paul and Cownley, if a higher temperature (100° C.) is employed. As the mean of two experiments the author obtained by the tedious official method of assay, 0.389 Gm. of total alkaloid from 20 Cc. of liquid extract, and from the lead precipitate a further quantity of 0.029 Gm., showing a total of 0.418 Gm. of alkaloid; while by his proposed method, in parallel experiments, he obtained as the mean quantity 0.421 Gm. of alkaloid. This is equal to 2.105 per cent., the British Pharmacopæia requiring that the liquid extract should contain not less than 2, and not more than 2.25 per cent. of total alkaloids.—Pharm. Journ., July 2, 1898, 3–4.

Liquid Extract of Pareira, B. P.—Improved Process of Preparation.—E. W. Lucas observes that the B. P. process for makig liquid extract of pareira is clumsy and unsatisfactory for several reasons. In the first place, it yields a sludge which is very difficult to filter, and when filtered it soon deposits again. Then, the filtered liquid extract never does contain anything like 25 per cent. of extractive. This is shown in an examination of six commercial liquid extracts, three from manufacturers, and three from pharmacists who prepared it for their own dispensing. The specific gravities varied from 1.006 to 1.045, the percentages of alcohol from 17.0 to 19.5 per cent. and the percentages of extractive from 16 to 24 per cent; but there appeared to be no absolute relation between the specific gravities and the percentages of extractive, althought he lower figures in both cases were obtained with the same liquid extract. He proposes a liquid extract of pareira of definite specific gravity, which may be conveniently fixed at 1.023, prepared by "pressure maceration" as follows: One pound of pareira in No. 10 powder is macerated with 10 fl.

ozs. of 20 per cent. alcohol in a covered vessel for 12 hours, expressed strongly, and the expressed liquid reserved. The dregs are then macerated for two hours with 4 fld. ozs. of the same menstruum; express, and repeat this once more with the same quantity of menstruum. Unite the expressed liquids, allow to stand 24 hours, filter, if necessary, and add sufficient 20 per cent. alcohol to bring the product to a specific gravity of 1.020. The product from 1 lb. of commercial pareira is about half a pint (= 10 fl. ozs. Imperial measure) of liquid extract. In an experiment recorded, 11½ fl. ozs. were obtained. Similar results were obtained with other samples, and the specific gravity of the united expressed liquids never fell below 1.020.—Pharm. Journ., June 10, 1899, 525.

Fluid Extract of Frangula Bark—Improved Process.—On the basis of his observations and studies upon the glucosidal constituents of frangula bark (which see under "Materia Medica"), Dr. Amweg recommends the following process for preparing a fluid extract: The powdered bark is well moistened with water and heated for one hour in boiling water, in order to coagulate the peculiar ferment existing in the bark. After standing for 12 hours, so that any of the secondary glucosides that have entered solution may be deposited, the moist powder is percolated with cold water, glycerin is added to the percolate (to the amount of 50 or 60 per cent. of the bark), and it is evaporated to the strength of a fluid extract. Alcohol of 60 per cent. may be employed instead of water, but the alcohol is here also completely evaporated, the residual extract dissolved in cold water, filtered, and the filtrate evaporated to a fluid extract after adding some (?) glycerin. The fluid extract obtained either way contains only the primary (in water soluble) glucosides, and may contain them to the amount of 25 or 30 per cent. The secondary (insoluble in cold water) glucosides remain on the filter from the filtration of the aqueous solutions. Fluid extracts obtained in this way keep well, according to the author's experience, and have only a faint bitter taste. The removal of the bitterness in the ordinary way, by means of lime and magnesia, is due to the fact that these alkaline earths render the secondary glucosides insoluble in diluted alcohol.—Pharm. Centralh., Oct. 27, 1898, 777.

Fluid Extract of Rhubarb—Preparation without Alcohol.—Dr. Amweg proposes the preparation of fluid extract of rhubarb with water and glycerin after the manner of preparing fluid extract of frangula bark by his method (which see). Fluid extract prepared in this way is free from mucilage and is recommended particularly for preparing the wine and the syrup of rhubarb. The author also recommends that

Fluid Extract of Senna be prepared by this method, since he finds senna, like rhubarb and frangula bark, to contain active soluble (primary) glucosidal constituents and insoluble (secondary) glucosidal constituents, which bear close analogy to those contained in the last named drug.—Ibid., 277–278.

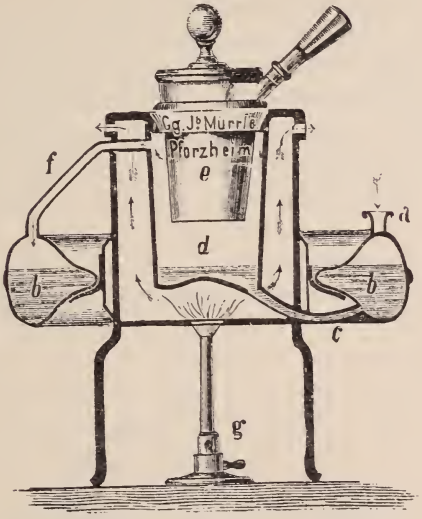
Fluid Extract of Kola—Preparation and Assay.—L. Bernegau recommends the following method for preparing fluid extract of kola: 1 kgm. of the powdered drug is moistened with a menstruum composed of 25 Gm. of sodium phosphate, 150 Gm. of glycerin, and 200 Gm. of spiritus dilutus, allowed to macerate during 12 hours, and then percolated to exhaustion with spiritus dilutus, for which purpose about 10 kgm. are required. The percolate is then concentrated to 1 kgm. The resulting extract when prepared from fresh kola nuts has a specific gravity 1.0142 and contains 0.85 per cent. of alkaloid; when prepared from fresh kola nuts dried at 80° the specific gravity was 1.0102, and it contained 1.717 per cent. of alkaloid; while when prepared from the commercial drug, dried at 80°, and powdered, the specific gravity was 0.9644 and the alkaloidal content 0.7 per cent. The use of sodium phosphate has for its purpose the more perfect solution of the alkaloidal constituents of the drug, as indicated in the author's paper on kola nuts (which see under "Materia Medica"), in which he also points out the advantages of fresh kola nuts over the ordinary commercial drug, and in which the process of assay employed by him is given.—Pharm. Ztg., Sept. 24, 1898, 683.

Fluid Extract of Convallaria Majalis—Preparation from the Flowers.—E. Morgulin expresses the opinion that the preparation of a fluid extract of convallaria majalis from the root, as required by the United States Pharmacopœia, is a mistake, since the root contains far less of the active glucoside than does the inflorescence. He therefore suggests that the flowers be used instead of the root. These should be dried at a temperature of 30° to 35°; and the fluid extract made with a menstruum composed of 35 parts of 95 per cent. alcohol and 5 parts of water. After reserving 85 parts of percolate for 100 parts of the flowers, the percolation is continued until 500 parts are obtained; this portion being evaporated after addition of 5 parts of glycerin, the residue—consistence not given—added to the reserve, and the weight brought to 100 parts with sufficient 70 per cent. alcohol.—Apoth. Ztg., April 26, 1899, 223; from Farmazeft, 1899, 167.

Fluid Extract of Djambo—Formula.—Cæsar and Loretz give a formula for preparing a fluid extract of djambo leaves, according to which the powdered leaves are treated as follows: 100 parts of the powder, 20 parts of alcohol (90 per cent.), 10 parts of glycerin, and 10 parts of distilled water are mixed, and after standing several hours, percolated with a mixture of 2 parts of 90 per cent. alcohol and 1 part distilled water. The first 85 parts of percolate are reserved, the percolation is continued to exhaustion, the exhaust percolate evaporated to 15 parts, mixed with the reserved portion, and the mixture filtered—the filtrate being brought to the weight of 100 parts by adding sufficient of a mixture of 2 parts alcohol and 1 part water.—Pharm. Centralh., Sept. 29, 1898, 700.

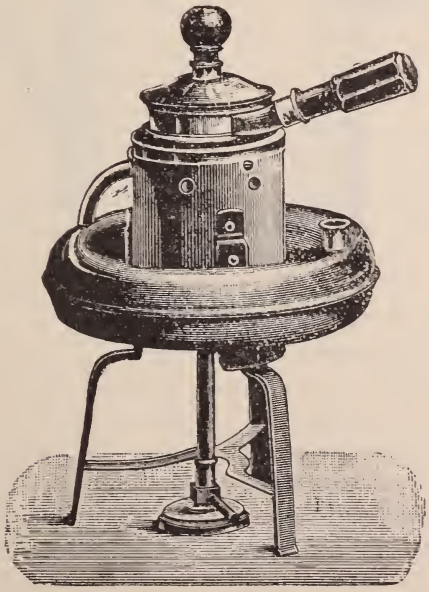
Infusion Apparatus—Convenient Form.—The infusion apparatus shown

FIG. 41.



Infusion Apparatus.

FIG. 42.



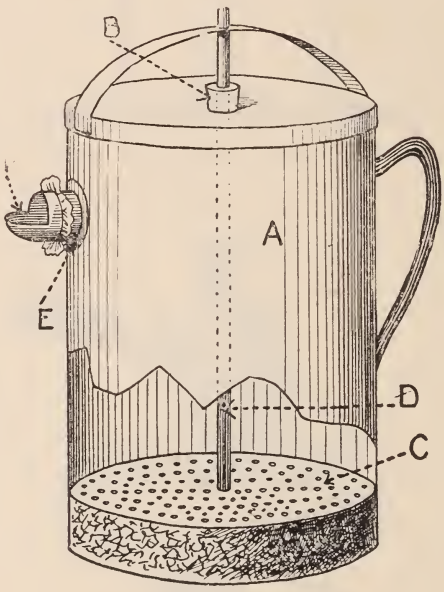
Infusion Apparatus.

by Fig. 41 in section and by Fig. 42 in its actual form, is recommended on

account of its completeness as well as utility. It consists of a small iron stove (or drum), surrounded by a brass ring-shaped water-reservoir, *b*, *b*, by means of which a constant supply of water is kept in the copper steam-kettle *d*, communication being effected by the tubes *c* and *f*. The infusion vessel *e* fits snugly into the steam kettle, and upon applying the flame of a Bunsen burner is soon surrounded by a current of steam, which circulates through *f* back to the reservoir. To prevent pressure the opening at *a* is never closed. There being very little loss of water by evaporation, it is recommended to use only distilled water for the steam bath. (The steam bath may also be used as a *sterilizing apparatus*.)—Pharm. Ztg., Nov. 23, 1898, 840.

Infusion Jar—Practical Construction.—John A. Forts describes an infusion jar made from an old tin can, which is shown by Fig. 43, and

FIG. 43.



Infusion Jar.

appears to possess some practical advantages. The can *A* is provided with a perforated disc, *C*, which slides through the rubber stopper in the manner shown at *B* by means of the rod *D*. This rod should fit snugly so that it may retain its position when raised or lowered. Near the top of the can a circular orifice, about 1½ inch in diameter, is cut, and a collar, *E*, projecting about an inch, is soldered into this orifice. A second collar or ring is made to fit over this collar, to form a spout, *F*. To use the jar place the drug in the vessel and then place the disk and rod as in the illustra-

tion. Pour in the boiling water and press the cover down, the rubber cork pressing tightly around the rod. Be careful to raise the rod a little so as to allow for the expansion that will be caused in the drug by the absorption of the water. Then place a small piece of muslin over the projecting collar and press the ring and spout over it. The infusion can then be poured out completely strained as soon as maceration is completed. A pressure of the rod will squeeze the last portions of the infusion from the dregs.—Amer. Drug, May 10, 1899, 253.

Infusions—Arrangement to Facilitate the Extraction of the Drug.—A. Popowski, in order to facilitate the extraction of drugs by infusion, recommends that the drug be placed into a sieve of silver wire, provided with three legs, so that it may be held suspended during the process of infusion as near the surface of the solvent as is practicable. The process of solution is thus facilitated in accordance with the well-understood principle of circulatory displacement; but the arrangement also offers conditions of convenience and cleanliness that make it a desirable adjunct to the dispensary implements of the pharmacist.—Apoth. Ztg., Oct. 1, 1898, 694; from Farmaz. Journ., 1898, 359.

Infusions—Preparation by Percolation.—Hans Benyschek has made a number of experiments with the view to determine the most effectual method of preparing infusions, using for examples the infusions of ipecac, digitalis, senega and ergot. The methods employed were: the customary one of adding boiling water to the drug and allowing to stand for a specified time; by digestion with boiling water on the water-bath during 15 minutes; by dilution of concentrated infusions; by dilution of the fluid extract; by maceration for 15 minutes in boiling water poured on the drug in a percolator, then percolating. He found the latter method to be the best in all cases, except that in the case of senega better results are obtained if the water be employed at a temperature of 60°–65°, instead of at the boiling temperature. In the case of the infusions of ipecac the actual amount of emetine contained in the root was determined by Kellar's method, and the same determinations were made in the infusion obtained by each method. The root contained 1.21 per cent. emetine; the infusions in the order named quantities corresponding to 0.74, 0.94, 0.85 1.02 and 1.13 per cent. of the drug used.—Pharm. Post., 1898, 759.

Infusions of the British Pharmacopœia, 1898—Changes from Previous Revisions.—Frederick Bascombe has determined the amount of extraction yielded by the infusion of the British Pharmacopœia, 1898, and compares the results with the residues obtained by Martindale and Cripps from infusions of the British Pharmacopœia 1885 in a table showing also the amount of drug used and the specific gravities of the finished preparations made by the two standards. Concerning the changes made in the new Pharmacopœia, he observes that there are twenty-two infusions, or six less than in the British Pharmacopœia of 1885, seven of the latter having been

omitted, and one—infus. scoparii—added. Twenty are made with boiling water; two – quassia and calumba—with cold. Nineteen are to be infused for fifteen minutes, senega and calumba for half an hour, and cinchona for one hour—explicit directions for adding the acid being now given in place of the ambiguous directions of 1885. Chiretta and cusparia are now made with boiling water instead of at 120° F., and the advantage in regard to chiretta is very marked, whilst cusparia yields slightly less residue of evaporation when made with No. 20 powder. The remaining official infusions are: aurantii, aurantii co, buchu, caryophylli, cascarillæ, digitalis, ergotæ, gentian co: krameriæ, lupulis (hops), rhei, rosæ acidum, scoparii, sennæ, serpentariæ and uva ursi. The author deduces from his experiments that apart from the reduction of time being a great advantage to the dispenser, the extractives in the case of the infusion of buchu, digitalis, gent. CO, hop, senega, and serpentaria agree with those of the 1885 British Pharmacopœia. Rhatany, however, if only bruised, yields considerably less than when made with No. 40 powder and infused for one hour, and uva ursi is also lower in extractive than in the corresponding infusion of 1885.—Pharm. Jour., March 11, 1899, 228.

Concentrated Decoctions and Infusions, B. P.—Unauthorized Additions. Some time before the issue of the British Pharmacopœia, 1898, George F. Messon undertook the examination of some concentrated decoctions and infusions of the market, with the view of finding how far the commercial articles corresponded, on dilution, to the official preparations they were intended to produce. Amongst other data noted was the weight of extractive yielded per ounce of the sample under examination, and he was struck with the discrepancy in results obtained from different specimens of the same preparation. This was particularly noticeable in a series of concentrated products from one source, which, as compared with others examined, were characterized by high specific gravity, low alcohol yield, and high residue of evaporation. On further examination he found these discrepancies to be due to the addition of soluble quantities of boric acid and of borax, amounting to as much as 6 oz. of the latter and 10 oz. of boric acid in the gallon (Imperial measure) of finished product. In the case of a specimen of dec. scoparii conc., from another source, salicyclic acid was found. Concentrated decoctions and infusions having been admitted into the British Pharmacopœia 1898, the author has recently examined a specimen labeled "This article is prepared in accordance with the British Pharmacopœia, 1898," but this also gave results practically identical with the foregoing.—Pharm. Journ., Feb. 18, 1899, 140–141.

LINIMENTA.

Linimentum Terebinthinæ, B. P.—Improved Manipulation.—F. H. Alcock and E. Withers call attention to the difficulties heretofore experienced by pharmacists in making the turpentine liniment of the

British Pharmacopœia. These difficulties have not been entirely overcome in the improved formula of 1898, but may be successfully overcome by the following *modus operandi:* Dissolve the camphor (1 oz.), previously cut into small pieces, in the oil of turpentine (13 fl. ozs.) contained in a bottle of suitable capacity, add the soft soap (1½ oz.), and shake vigorously until the soap is thoroughly diffused throughout the liqnid and no lumps are visible, this occupying five minutes; then add the whole of the water (5 fl. ozs.), shake vigorously, and repeat the shaking at intervals until a uniform liniment is obtained. The product is ready for use at the end of forty-five minutes or even less.—Pharm. Journ., March 18, 1899, 255-256.

Speaking of the difficulties frequently experienced in making small quantities of Linimentum Terebinthinæ, J. Rutherford Hill observes that it is not only readily overcome, but that the process is greatly expedited, if the soap is added in the form of Hebra's spiritus saponis (2 ozs. soft soap dissolved in 1 fl. oz. 90 per cent. alcohol). An aliquot part of this solution (2 fl. ozs., 30 Mm.) is added to 2 fl. ozs. of water in a stoppered bottle; then add gradually the solution of camphor in the oil of turpentine, shaking vigorously after each addition, and finally make up to 1 pint (Imp. Meas.—Rep.) by the addition of sufficient water. A perfectly creamy preparation can then be finished in a few minutes.—*Ibid.*, 260.

Linimentum Camphoræ—Determination of Strength.—Norman Leonard and H. Metcalfe Smith recommend the following simple process for determining the strength of camphor liniment: From 3 to 5 Gm. of the camphorated oil are heated for two hours at 120° in a flat-bottomed dish or flask, the residue weighed, and 0.15 per cent. of its weight deducted. The difference in weight from the original weight represents the quantity of camphor in the sample. The correction of 0.15 per cent. is necessary because olive oil under the conditions of heating employed gains that per centage in weight. A simple plan that gives approximately correct results consists in ascertaining the specific gravity of the sample, and multiplying it by the factor 0.00045, this number corresponding to the rise in the specific gravity of olive oil occasioned by every 1 per cent. of camphor that is added. Being based, however, upon olive oil having the specific gravity 0.9165, the method is inapplicable unless the oil used for preparing the liniment has that specific gravity.—Pharm. Journ., Nov. 26, 1898, 545; from Analyst, xxiii., 281.

Liniment—Useful Formula.—A. E. Hiss recommends the following formula for a stock liniment, which he has found useful for rheumatism, sprains, bruises, and for aches and pains in general:

Camphor	2 ounces av.
Oil of sassafras	1 fluidounce.
Oil of origanum	2 fluidounces.
Tincture of opium	2 fluidounces.
Tincture of capsicum	6 fluidrachms.
Alcohol	q. s. ad 32 fluidounces.

Dissolve the camphor in a portion of the alcohol, add the oils, the tinctures and the remainder of the alcohol.—Bull. Pharm., Aug., 1898, 345.

Anti-Rheumatic Liniment—Formula.—The following formula for an anti-rheumatic liniment is given in "Bull. gén. de Therap.": Oil of turpentine, 200; sodium salicylate, gamboge, myrrh, canella (cinnamon (?) Rep.), of each, 10. To be applied thrice daily and covered with cotton. —Apoth. Ztg., Mar. 11, 1899, 12).

Liniment for Perspiring Hands—Formula—The following formula for a liniment that is useful for checking the perspiration of the hands is recommended in "Bull. Soc. de Pharm. de Sud-ouest" (1898, 309): Borax, salicylic acid, of each 15; boric acid, 5; glycerin, alcohol, of each 60. A portion of the alcohol may be replaced by the same quantity of cologne water. The liniment is to be applied with friction three times a day.—Pharm. Journ., Sept. 3, 1898, 279.

Lotio Hydrargyri Nigra, B. P.—Objection to Tragacanth.—Wm. Duncan calls attention to a fault in the new British Pharmacopœia formula for lotio hydrargyri nigra. The addition of tragacanth, prescribed as a suspending agent, simply spoils the preparation, the mercurous oxide clotting with the insoluble gum. A return to the old formula is therefore advised. —Pharm. Journ., Nov. 19, 1898, 539.

Solutions against Lice—Formulas.—Several washes for the destruction of lice are highly recommended as follows:

1. Hydrargyr. Bichlor., 0.25; ol. terebinth, 30.0; glycerin, 40.0; spir. camphor, 175.0.—This in "Le Concours Médical."

2. Aq. rosarum, 500; liq. van Swietens,* 100.0; chloral hydrate, 25.0. —This in "Les Nouv. Remédes.—Apoth. Ztg., May 6, 1899, 251.

Chilblain Lotion—Formula.—"Sam Bucus" recommends the following formula for a chilblain lotion: Balsam of Peru, ½ oz.; alcohol, 1½ oz. Dissolve and add: Hydrochloric acid, ½ drachm; comp. tinct. benzoin, ½ oz. To be applied twice a day.—Bull. Pharm., Jan., 1899, 13.

LIQUORES.

Liquores—Why some are made by Measure and others by Weight.—Dr. Charles Rice observes that the reason why liquor sodæ chloratæ is to be made to a definite weight, instead of to a definite volume, is this, that, on the general principle of aiming at products the uniform composition of which can be controlled and ensured as far as possible, a separation of the solution of sodium hypochlorite, etc., from the precipitated calcium carbonate, and an adjustment of the filtrate and wash-waters to a definite volume, was found to be liable to lead to error. If we bring together, in a tared vessel, weighed quantities of chlorinated lime (of a definite

* Van Swieten's Liquor (Antisyphiliticus) is prepared by dissolving 0.1 Gm. bichloride of mercury in 10 Gm. of alcohol and adding 90 Gm. of distilled water.—Rep.

strength) and of sodium carbonate, with water, and if we finally make up the mixture to a definite weight with water, we are reasonably certain that, whenever we repeat the practice, we have present in our vessel the same quantities of both liquor and solid products. It only remains to separate them as far as practicable; and if we do not succeed in separating the whole of the liquor, and throw some of it away with the precipitate, this is merely a question of profit or loss, and does not affect the quality or strength of the liquid portion actually separated. The case is practically like that of preparing a tincture by maceration. If we allow a drug to remain in contact with a suitable menstruum for a certain time the menstruum will take up all soluble matters, and the solution will eventually be not only outside of the particles of the drug, but also inside of these particles. That is to say, when every soluble thing is dissolved, the solution will be uniform throughout. Now, whether we merely pour off the liquor, or, in addition, squeeze the dregs to recover the part retained by the drug, is merely a matter of economy. It does not affect the strength of the solution. On the other hand, in the case of Fowler's solution, where there is no interfering bulky precipitate to deal with, there was no need of adjusting to weight. Measure was used here, in accordance with the general principle governing the formula in the United States Pharmacopœia.—Western Drug., Nov., 1898, 491.

Official Solutions—Doubtful Utility of Several of them.—Prof. L. E. Sayre has taken pains to collect information from pharmacists and physicians concerning the extent to which some of the official solutions are employed, and concludes that the use of three of them, viz., liquor ferri acetatis, liquor ferri nitratis, and liquor arsenii et hydrargyri iodidi, is so restricted as to make it desirable that they be eliminated from future editions of the Pharmacopœia. The two ferric solutions possess no advantage over solution of ferric chloride, while the last named is so unstable as to give rise to trouble whenever it is dispensed, unless it is made extemporaneously.—Drug. Circ., Nov., 1898, 260.

Solution of Ammonium Acetate, B. P.—Convenient Preparation.—The British Pharmacopœia 1885, directed solution of ammonium acetate to be made by diluting a concentrated solution with water. The British Pharmacopœia, 1898, recognizing the importance of carbonic anhydride in this solution, directs it to be prepared by the older method of the 1867 Pharmacopœia, except that a definite quantity of ammonium carbonate is to be neutralized instead of a definite quantity of acetic acid. J. Rutherford Hill observes that this process is a tedious one on account of the difficulty of accurately determining the point of neutrality or slight acidity—the latter being preferable—and he, therefore, suggests that the ammonium carbonate be kept in stock in a powdered and assayed condition, adjusted to the acetic acid, also of assayed strength, to be used as required. Simple weighing of the required quantity of ammonium carbonate and solution

in the measured quantity of acetic acid then at once results in a perfectly satisfactory preparation.

Solution of Ammonium Citrate, B. P., which was formerly made by neutralizing citric acid with ammonia water, is now also directed to be made by neutralizing solution of citric acid with ammonium carbonate. The author suggests that assayed ammonium carbonate and citric acid may here also be used with advantage.—Pharm. Journ., Jan. 21, 1899, 59.

Liquor Alumini Acetici—Permanent Preparation.—G. Candussio states that a very stable solution of aluminum acetate is obtained if acetic acid is neutralized with calcium carbonate, the solution of calcium acetate formed decomposed with aluminum sulphate, and then immediately filtered. Still better results are obtained if barium carbonate is substituted for calcium carbonate, the resultant preparation possessing permanent stability. The author holds the view that owing to the more energetic reaction between the sulphate and the barium salt, the production of an allotropic gelatinous form of aluminum acetate is completely prevented.—Apoth. Ztg., July 20, 1898, 508; from Pharm. Post, 1898, No. 25.

Liquor Potassii Citratis—Possible Presence of Bacillus Subtilis.—William A. Chamberlin, on examining a solution of citric acid kept in stock, along with solution of potassium bicarbonate for the convenient preparation of "liquor potassii citratis," noticed a heavy flocculent deposit or growth, which, on nearer examination, proved to be the ordinary hay bacillus, *bacillus subtilis*. This is ordinarily found in water, air and infusions of hay. It has locomotive powers, and grows at ordinary room temperatures, in all culture media, whether acid or alkaline. It follows that a solution of potassium citrate prepared from a solution containing this bacillus must decompose in a very short while, and is unfit for use. A remedy for the difficulty would be to make both the solutions with *hot distilled* water. An infected solution of either the acid or the bicarbonate may be freed from the bacilli by heating it for twenty minutes each day in a water-bath. This kills the bacilli, for the spores which are not killed at 100 Cc., will have all been transformed into bacilli during the period named.—Alumni Rep., Aug., 1898, 157.

Lime Water—Rapid Preparation.—E. J. Evans gives a brief record of experiments made to determine the relative merits of prolonged or short exposure of lime to the solvent action of water, the conditions favoring its preservation, or influencing the rate of solution, and finds that lime water can be made in a few minutes, if a fairly pure caustic lime be recently slaked before using. Also that when intended to be kept, the lime water should be in contact with the excess of lime used.—Proc. Brit. Pharm Conf., 1898, 462–463.

Liq. Ferri Albuminat. Ph. Germ.—Necessity of Freshly Made Solution of Oxychloride of Iron.—"A. H." has observed that the preparation of liq.

ferri albuminat. is not always satisfactory even when the directions of the Germam Pharmacopœia are implicitly followed. For reasons not hitherto explained, it has repeatedly occurred that on mixing the solution of ferric oxychloride with albumen there was either no precipitate formed at all, even after careful addition of soda solution, or a precipitate was produced which was washed with difficulty, and was again dissolved during the necessary process of washing. He has now found the fault to be due to the condition of the ferric solution. If this has been freshly prepared it is an easy matter to prepare the albuminate of iron solution with expedition and satisfaction.—Apoth. Ztg., April 19, 1899, 205.

Solutio Ferri Peptonati Dialysata—Preparation.—Loeke Dokkum observes that if a solution of albumoses and peptones, free from coagulable albumen, is subjected to fractional precipitation with diluted ferric chloride solution, the albumoses may be completely removed and the peptones are retained in solution. The solution must be neutral, and excess of ferric chloride must be avoided, else the ferro-albumoses are redissolved. The peptone solution may then be ferrated by the addition of ferric chloride, and the solution so obtained, when subjected to dialysis, constitutes an efficient preparation of iron peptonates.—Pharm. Centralh., July 28, 1899, 557; from Pharm. Weekbl., 1898, No. 45.

Saturated Solution of Potassium Iodide—Definition and Preparation.—H. P. Hynson calls attention to the variability of saturated solution of potassium iodide as dispensed by different pharmacists. This is due to the failure to properly define what is meant by the term "saturated," and the consequent uncertainty of both prescriber and dispenser. The author holds that a saturated solution is intended to be one which holds in solution the greatest amount possible of a solid under ordinary variations of temperature. Such a solution of potassium iodide is obtained by dissolving 480 grains of the salt in 5½ fluid drachms of hot water, and making the solution up to the measure of 8 fluid drachms (adjusting it accurately when cold (?) Rep.). This is practically a saturated solution, and possesses the advantage of containing 1 grain of the salt in 1 minim, which, the author thinks, is the quantity expected by the prescriber.—Proc. Maryland Pharm. Assoc., 1898, 81–82.

Liquor Arsenici Hydrochloricus, B. P.—Alleged Loss of Hydrochloric Acid During Its Preparation.—It having been suggested to Bertram Bockburn that the boiling which is necessary to dissolve the arsenous anhydride in the preparation of the official liquor arsenici hydrochloricus drives off a part of the hydrochloric acid, he prepared a quantity of the solution carefully according to the Pharmacopœia, and found that there was no appreciable loss of acid. Titrimetric examination of the solution and of a corresponding mixture of acid and water, made in the cold, gave exactly the same results.—Pharm. Journ., April 22, 1899, 367.

Hypodermic Solution of Mercuric Chloride—Preparation with Oil and Guaiacol.—E. Bazin gives the following directions for preparing a hypodermic solution of mercuric chloride in oil and containing guaiacol, which has been used with advantage by Dr. Lagrange (see *Mercuric Chloride* under "Inorganic Chemistry"): Olive oil, deprived of free fatty acids by shaking out with alcohol, is treated with animal charcoal, filtered, heated to 100° C. to dissipate traces of alcohol, and then sterilized in small flasks at 120° C. Then 0.5 Gm. of mercuric chloride is triturated with 100 Cc. of the sterilized oil in a mortar, previously sterilized by burning alcohol in it, the mixture transferred to a small flask, closed with a rubber stopper, and heated to 75°–80° C. to effect solution. When cold, 3 per cent. of guaiacol (*synthet. recryst.*) is added, well mixed, and the finished solution is filled into small flasks having a capacity of 1 Cc., which have been heated to 120°–150° C. before filling. The solution keeps indefinitely if protected from air.—Apoth. Ztg., May 31, 1899, 323; from Petit Monit. de la Pharm., 1899, 3207.

Liquor Strychninæ Hydrochloridi, B. P.—Modification of Official Process.—An objection that has been brought forward to the use of strychnine hydrochloride to prepare the official liquor, is the readiness with which, it is claimed, the crystals effloresce when it is exposed to the air, and the consequent variation in strength of the finished product. Bertram Cockburn suggests that the hydrochloride be extemporized by using an aliquot part of the the alkaloid and acid, and proposes the following formula: Strychnine, 1 Gm.; diluted hydrochloric acid, 1 Cc.; alcohol, 30 Cc.; distilled water, enough to make 100 Cc. The solution prepared by this formula is very faintly acid, and was proved by titration to contain the exact quantity of strychnine hydrochloride.—Pharm. Journ., April 22, 1899, 367.

Liquor Cresoli Saponatus — Extemporaneous Formula.—If instead of using a linseed oil soap, as required by the Germ. Pharm. III., an olein soap is employed for preparing liquor cresoli saponatus, popularly known as

Lycol, a product may be made extemporaneously, according to Welman, which is the equivalent of the official product in every respect. He introduces 500 Gm. of cresol into a vessel having a capacity of 1 ¼ liter, adds 250 Gm. of olein, and, after shaking once, a solution of 50 Gm. of potassium hydroxide in 200 Gm. of distilled water. Saponification is then effected by vigorous shaking. A cheaper substitute, which is particularly recommended for extensive disinfection, is obtained by substituting 160 Gm. of ammonia water (s. g. 0.960) for the potassium hydroxide solution, and adding sufficient water, in the above proportion, to make 1000 Gm. of product. Welman also makes a

Creolin extemporaneously, using for this purpose crude cresol, which contains from 20 to 30 per cent. of pure cresol in admixture with various empyreumatic oils. The proportions are the same as in the foregoing, viz.,

crude cresol, 500 Gm.; oleic acid, 250 Gm.; ammonia water (sp. gr. 0.960), 160 Gm.; water enough to make 1000 Gm. As is well known, the cresol soap solutions (lysols) unite with their own weight of hydrocarbons, as well as with other carbon compounds, and though at first forming turbid mixtures, these upon repeated shaking eventually become clear. Such mixtures may be made with petroleum benzin, ligroin, heavy tar oils, ether, acetic ether, chloroform, ethyl, methyl, amyl-alcohol, naphthalin, petroleum, etc., and these mixtures, like the kindred creolin, readily form permanent emulsions with water.—Pharm. Centralh., July 28, 1898, 552.

Zinc-Iodide-Starch Solution—Simplified Preparation.—Dr. Leyda recommends the following process, which, if carefully followed, produces "zinc-iodide-starch solution" that will keep unchanged indefinitely: 2–3 Gm. of potato starch are intimately triturated with 50–100 Cc. of water in a porcelain mortar having a rough surface, and the mixture is allowed to stand, well covered, for an hour. It is then heated in a selzer flask (under pressure [?], Rep.) by means of an oil bath at a temperature of 130° C. for from 2 to 4 hours, allowed to cool off, and transferred to a liter flask with sufficient water to about three-fourths fill it; the mixture is well shaken, set aside for 24 hours and then filtered. Then 20 Gm. of zinc chloride and 2 Gm. zinc iodide—the latter prepared from powdered zinc and iodine according to the German Pharmacopœia—are dissolved in the clear liquid, which is then brought to the volume of 1 liter, allowed to stand 24 hours and again filtered, if necessary. It is important that the zinc iodide should contain no free iodine, and it must be preliminarily tested for this before adding it to the starch solution.—Chem. Ztg., 1898, 1086.

MISTURÆ.

Brown Mixture—Improved Formula.—Referring to the improved formula for brown mixture reported to the Maryland Pharmaceutical Association in 1897 (see Proceedings, 1898, 703), Charles Schmidt observes that the proposed formula, though giving a clear preparation, is more in the nature of a syrup. A less radical departure from the official formula consists in using only one-fourth the amount of sugar directed in the proposed formula, the resultant preparation being quite as clear. A perfectly clear preparation is obtained if a little paper pulp is added to the aqueous fluid containing the extract of licorice, camphorated tincture of opium, wine of antimony and spirits nitrous ether, before filtration, the filtrate being returned until it passes satisfactorily clear. The mucilage should invariably be added *after* the filtration of the aqueous liquid.—Proc. Maryland Pharm. Assoc., 1898, 69.

Magnesia Mixtures—Prevention of Caked Deposits.—Wm. Duncan calls attention to the liability of calcined magnesia in aqueous mixtures to cake so as to form a hard non-diffusible deposit. To overcome this tendency he recommends that the magnesia be boiled for a few minutes in

half the water prescribed, then adding any sugar (or syrup) that may be prescribed, continuing the boiling a few minutes, allowing to cool, and adding the other ingredients. The caking is due to the formation of a hydrate, and when this has been formed, as it will be expeditiously on boiling with water, the mixture remains smooth.—Pharm. Jour., Nov. 19, 1898, 539.

Diarrhœa Mixtures—Formulas.—A. E. Hess recommends the following formulas for diarrhœa mixtures which he has found to give good satisfaction.

1. *Mixture for Adults :*

Deodorized tincture of opium	1 fluidrachm.
Salicylic acid	20 grains.
Bismuth subnitrate	80 grains.
Tincture of kino	2 fluidrachms.
Blackberry brandy	2 fluidrachms.
Distilled water q. s. ad	2 fluidounces.

Dose : A tablespoonful every half, one, two or three hours, according to circumstances.

2. *Mixture for Children :*

Tincture of catechu	1 fluidrachm.
Glycerin	4 fluidrachms.
Neutralizing cordial	1 fluidounce.
Compound chalk powder	120 grains.
Cinnamon water q. s. ad	2 fluidounces,

The dose is from a few drops to a teaspoonful repeated every half, one, two, or three hours, according to the severity of the case and the age of the child.—Bull. Pharm., Aug., 1898, 344.

Anæsthetic Mixtures—Schleich's Proportions.—Dr. H. Garrigues records the results of his experience with the anæsthetic mixtures prepared in the proportion recommended by Schleich, which speak in favor of these mixtures over ether or chloroform by themselves. The proportions in these mixtures vary according to the intended use :

Mixture No. 1, which is used in short operations only, is composed of : Chloroform, 45 p. ; petroleum ether, b. p., 60 to 65° C., 15 p. ; ether, 180 p. This mixture has the boiling point 38° C., if the chloroform and ether used are of official (Germ. Phar.) quality.

Mixture No. 2 is intended for operations that require some time, and is made in the following proportion : Chloroform, 45 p. ; petroleum ether, 15 p. ; ether, 150 p. This boils at 40° C.

Mixture No. 3, which is used when mixture No. 1 fails to produce anæsthesia within 10 minutes, is prepared with : Chloroform, 30 p. ; petroleum ether, 15 p. ; ether, 80 p. This mixture boils at 42° C.

The boiling point of these mixtures exceeds the temperature of the body only in an insignificant degree, hence the anæsthetics are again rapidly eliminated from the body after exerting their effects.—Pharm. Centralh., April 20, 1899, 254; from Therap. Monatsh., 1899, 178.

OLEA.

Phosphorated Oil—Changes on Keeping.—H. Ekroos records some investigations made to determine the changes that the elementary phosphorus undergoes in phosphorated oil by age, as well as to determine a method for ascertaining the amount of unchanged phosphorus. He has not succeeded in establishing a reliable method of assay, and finds that the various methods heretofore proposed for the assay of free phosphorus—Dusart and Blondlet's, Mitscherlich's, the bromine and the nitric acid method—are equally unreliable, none of them indicating quite 50 per cent. of the phosphorus actually contained in the preparation. He concludes that phosphorated oil contains only a portion of phosphorus in its elementary form, the other portion being in form of an, as yet, undetermined combination, possibly with the fatty acids, in which combination it is either not oxidized at all by either bromine or nitric acid, or very incompletely oxidized and not carried over with water-vapors. This compound of phosphorus is formed to some extent immediately upon its solution in the oil, but increases with age. It is, therefore, not desirable to keep phosphorated oil ready prepared in stock.—Arch. d. Phar., *236*, No. 8 (Nov., 1898), 627–635.

Calendula Oil—Formula.—George W. Beringer submits the following formula for calendula oil, or, more correctly, calendulated oil, which has been used with advantage by specialists as a soothing application to catarrhal surfaces, particularly as a spray or dressing after treatment with aqueous liquids, such as Seiler's solution: Contused calendula, 100 Gm.; alcohol, 75 Cc.; ammonia water, 2 Cc.; pure olive oil, 1000 Gm. Mix the alcohol and ammonia water, moisten the drug with the mixture, add the olive oil, and macerate for three or four days at a temperature of 60° to 70° C. in a suitable container, with frequent agitation. Then express and filter.—Amer. Journ. Pharm., June, 1899, 269.

OLEORESINÆ.

Oleo-Resin of Male Fern—Standardization.—Feodor Miehle, in view of the variability in the percentage of filicic acid—from 9.75 to 26.885 per cent.—found in the oleo-resin of male fern by Icaro Brocchi, and others recommends that in future editions of the Pharmacopœia (Germ.), the percentage of filicic acid be definitely adjusted by the addition of sufficient castor oil. An oleo-resin, so standardized, would have the further advantage of not precipitating filicic acid on standing, as is the case with the present oleo-resin of the German Pharmacopœia, while the addition of

castor oil causes it to act as a laxative, as well as tænifuge. In accordance with the idea of combining the laxative with the tænifuge effect, the author proposes a formula for "oil of male fern capsule," which see.—Apoth. Ztg., Nov. 5, 1898, 777.

Oleo-Resin of Male Fern—Importance of its Volatile Constituents.—Referring to H. Miehle's observation concerning the advisability of standardizing the oleo-resin of male fern on the basis of a certain percentage of filicic acid, Dr. Karl Dieterich observes that filicic acid is by no means proven to be the only active constituent, the volatile oil being doubtless concerned in its activity as a taenifuge. This is shown in the fact that old oleo-resin, containing the full amount of filicic acid but the volatile oil in a more or less resinified condition, proves ineffective. A method of standardization to be of value must therefore include with the filicic acid also the volatile constituents of the rhizome, and such a method has not yet been developed with sufficient accuracy for adoption into the Pharmacopœia. Dr. Dieterich approves of the addition of castor oil to the oleo-resin as prepared by Mr. Miehle. The proper safeguard against inefficacy is to employ the oleo-resin in as fresh a condition as is practicable, and to thoroughly shake the same before dispensing it, so that all of its constituents may be represented in the dose; for, as is well-known, a deposit almost invariably forms in the oleo-resin on standing, this deposit being largely composed of filicic acid. Old, resinified oleo-resin should not be dispensed.—Apoth. Ztg., Nov. 9, 1898, 788.

Extractum (oleo-resinæ) Filicis Spinulosi Aethercum—An Efficient Substitute for Oleo-Resin of Male Fern.—Lauren has prepared an ethereal extract from the rhizome of *Aspidium spinulosum*, Sev., and finds it to be an efficient tænifuge. Its action is precisely the same as that of the oleo-resin of male fern, and he recommends it as an efficient substitute for this, particularly in localities in which filix mas is difficult to obtain, as is the case, for instance, in Finland.—Pharm. Ztg., Oct. 15, 1898, 744; from Finsk. Läkaresällskapets Handl., *39*, 9.

PILULÆ.

Vallet's Mass—Method of Assay and Criticism of Official Formula.—Henry N. Thompson recommends the following convenient method for assaying Vallet's mass: 1.1573 Gm. of the sample are completely washed out with distilled water, the insoluble residue being collected on a plain filter for this purpose. When sufficiently washed, the filter and contents are transferred to a beaker, mixed with distilled water and sufficient diluted sulphuric acid until effervescence ceases and the mixture has acquired a distinct acid reaction. It is then filtered, the filter thoroughly washed with distilled water—until the washings fail to react with ferricyanide test solution—and the mixed filtrate and washings are then titrated with decinormal potassium permanganate solution, each Cc. of which

consumed represents 1 per cent. of ferrous carbonate in the sample under examination when 1.1573 Gm. of the latter are used. A sample of Vallet's mass made in strict accordance with the United States Pharmacopœia in every detail, assayed by this method in several experiments, showed an average of 38.66 per cent. of ferrous carbonate. The calculated percentage, based on the formula, is 40.54 per cent. of ferrous carbonate, and this would probably be the percentage if it were not for unavoidable loss, due to manipulation and oxidation. The percentage found, 38.66 per cent., may therefore be taken as indicative of a fairly good product. Four samples procured from as many Philadelphia manfacturing firms, indicated by this process as an average of duplicate experiments, 28.90, 37.73, 49.18 and 33.08 per cent. of ferrous carbonate. Attention is called by the author to the fact that the amount of sodium carbonate directed in the official formula is insufficient to completely decompose all of the ferrous sulphate.—Amer. Journ. Pharm., July, 1898, 343–345.

Creosote Pills—Efficient Excipient.—Delhashe has tried the formula recommended by Agosti for making creosote pills, which consists in adding an equal weight of water to creosote and massing the mixture with powdered licorice root, and finds it efficient. The pills do not ooze with creosote, and at the same time readily disintegrate in water slightly acidulated with hydrochloric acid. He recommends as an improvement, however, that the water be reduced one-half, the proportion of ingredients found most satisfactory being as follows: Creosote, 0.10 Gm.; water, 0.05 Gm.; powdered licorice root, 0.20 Gm.—Pharm. Journ., Nov. 12, 1898, 505; from Rép. de Pharm. X., 438.

Creosote Pill Mass—Formula.—"L'Union Pharm." gives the following formula for the convenient preparation of creosote pills: Creosote, 3; oil of sweet almonds, lard, calcined magnesia, of each 1, are mixed well together and allowed to stand during 24 hours. The mass is then again thoroughly triturated and preserved in a well-covered porcelain (or glass) vessel. When pills are demanded, these are expeditiously prepared from the mass so produced.—Apoth. Ztg., May 6, 1899, 251.

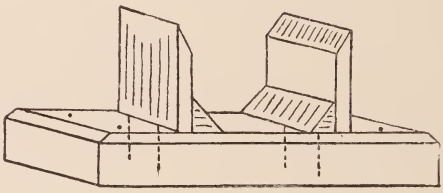
Pills of Potassium Iodide—Lanolin as Excipient.—The following formula for making pills of potassium iodide is recommended in "Münch. Med. Wochenschrift:" Potassium iodide, 10.0 Gm.; sugar of milk, 5.0 Gm.; lanolin, 3.0 Gm. To make fifty pills. Pharm. Centralbl., Nov. 24, 1898, 846.

Uva Ursi and Salol Pills—Formula.—Dr. Oscar Werler has used pills of uva ursi and salol with advantage in the treatment of gonorrhœa, prepared according to the following formula: Extract. uvæ ursi, sicci, saloli, āā 5.0. Ft. pil. No. 30, consp. pulv. aromatic. S.—One to three pills 3 times daily after meals. The extract of uva ursi is obtained by evaporating the fluid extract, 15 Gm. yielding about 5 Gm. of dry extract.—Pharm. Centralbl., March 16, 1899, 164.

PULVERES.

Powder Folder—Cheap Construction.—Joseph F. Hostelley observes that the gravest fault with the ordinary powder folder is that it costs money. The one shown by Fig. 44 need not cost a single cent. It is described thus: A block of hard wood, 5½ inches long, 2 inches wide and ¾ inch thick, was cut from a smooth board; holes were bored with an awl, to the depth of ½ inch, along the edges of each side, ½ inch from the edges, and about ½ inch apart. Two other pieces of hard wood were then prepared, 1⅝ inch square, and ¼ inch thick; one edge of each being sharpened, as seen in upright pieces in cut; into the opposite edge of each were driven two wire nails, each ¼ inch from the edge and centrally placed between

FIG. 44.



Powder Folder.

the sides, of proper size to fit snugly into holes in the block, after the heads had been filed off. The triangular strips seen in cut were glued to the uprights to better support them. It will be seen that when these two vertical pieces are adjusted into position, as shown in the sketch, there is afforded a means of folding a powder just as would be done over the edges of a box. These arms can be set to meet the requirements of a box or envelope of almost any dimensions, by merely inserting the nails in uprights into holes in the block that make the desired distance lie between the sharp edges of uprights.—Amer. Drugg., March 10, 1899, 131.

Granular Effervescent Preparations, B. P.—Practical Observations.—Alexander Davidson and George Lunan, in view of the admission of several additional granular effervescent preparations into the British Pharmacopœia, and the conviction that the granular effervescent form of exhibiting drugs is on the increase, offers some observations of a practical nature which they have made regarding the British Pharmacopœia preparations of this class. Working separately, their observations tended to show that the temperature required by the British Pharmacopœia—93.3° to 104.4° C.—was, for the purpose of granulation, excessive, and resulted in unnecessary loss of carbonic anhydride; that the products from each of the six official preparations, instead of being "about 100," varied from 108 to 99, and that it would be impossible, using the excessive temperature of the British Pharmacopœia, to obtain results approximating to 100. These observations confirm Mr. Dyer's statement that there is a loss of about one-

third of the carbonic anhydride in preparing the granules by the British Pharmacopœia process, but that the loss might be modified by using a low temperature. In the opinion of the authors the heat of a water-bath is amply sufficient for the purpose of granulating, and if the surface of the pan or dish shows a temperature of, from 60° to 70° C., it fulfills all requirements. They regard the proportions of tartaric and citric acid directed in the formula for "effervescent sodium citro-tartrate" to be the most suitable, and recommend that the plastic mass obtained by the use of a temperature not exceeding 70° C., should be at once passed through the sieve when it has reached a proper condition, without waiting for it to assume the granular form, and then separating into various sized granules as required by the British Pharmacopœia. This causes a much shorter application of heat, and the formation of granules of definite size. The importance of uniformity in size of granules is made apparent by experiments made to determine the relation of weight to volume, since these preparations are customarily directed to be taken in one or more teaspoonful doses. The authors find that when the granules are made by passing them through sieves of different sized meshes, the proportions are as follows:

Granule.	Weight of a fluid drachm measureful.	Weight of an ordinary teaspoonful.	Weight of a heaped teaspoonful.
No. 6 sieve.....	23.25 grains	38 grains	64 grains.
No. 9 sieve.....	26.0 "	42 "	74 "
No. 12 sieve.....	32.5 "	47 "	82 "

The intention in the prescriber's mind in ordering a teaspoonful of these preparations is that the patient will get 60 grains, containing, as he believes, a certain quantity of medicament. To attain this condition, the most definite method would be to weigh the dose; but this being impracticable, uniformity in dose can only be obtained if the official directions require that the plastic mass be pressed through a definite size of sieve. No. 9 fulfils most conditions, and besides is the most suitable for the lower temperatures suggested by the authors. It is sufficiently large to give a granule of such size that drying will not render it pulverulent. In dispensing, a measure should be sent with the prescription that will hold the quantity ordered.—Pharm. Journ., Feb. 18, 1899, 141–143.

Granular Effervescent Preparations—Loss of Available Carbon Dioxide During Granulation.—C. S. Dyer communicates the results of some experiments undertaken with the view to establish a standard for comparing commercial specimens of granular effervescent salts. He found that in the preparation of these salts a portion of the sodium bicarbonate combines absolutely with the citric acid employed in the process, so that only about 60 to 70 per cent. of the sodium bicarbonate remains uncombined and available for producing carbon dioxide when the preparation is dis-

solved in water. This is evidently a sacrifice to produce a granular preparation, since the citric acid is directed in the formulas solely because it causes the mass to flux and form granules, while the tartaric acid does not combine with the sodium bicarbonate under the conditions of the process, but likewise does not flux. The granular effervescent preparations, if they are to conform to the British Pharmacopœia, should therefore show at least 50 per cent. of its bicarbonate available for producing effervescence. —Proc. Brit. Pharm. Conf., 1898, 464–466.

Cocaine Powder—A New Dermatological Agent.—Unna recommends as an anaesthetic application to boils, wounded surfaces, &c., a powder composed of 0.5 to 1.0 Gm. cocaine hydrochloride and 10 Gm. magnesium carbonate. It is applied by dusting and then covered with moistened cotton. It is economical and keeps better than solutions commonly employed for this purpose.—Pharm. Centralh., Sept. 29, 1898, 702.

Antiseptic Nose Powder—Formula.—John A. Foote recommends the following formula for a nose powder, which possesses all the advantages of Seiler's tablets. It is used by insufflation:

Cocaine hydrochloride	22 grains.
Menthol	8 "
Thymol	8 "
Eucalyptol	8 "
Oil of wintergreen	4 mins.
Oil of sassafras	2 "
Sodium bicarbonate	30 grains.
Sodium borate	30 "
Magnesium carbonate	100 "
Sugar of milk (finely powdered)	3 ozs.

Dissolve the menthol and thymol in the oils. Triturate the cocaine with the magnesia and add the oily mixture in small portions until it is fully absorbed by the magnesia, and continue the trituration. Then add the other solids, triturate thoroughly and sift the powder in a fine sieve.—Amer. Drugg., Jan., 25, 1899, 37.

Headache Powder — Formula.—A. E. Hiss recommends headache powders made by the following formula: Acetanilid, 7 grs.; sodium bicarbonate, 2 grs.; caffeine, 1 gr. Envelope in paper, or dispense in form of capsule or cachet.—Bull. Pharm., Aug. 1898, 344.

Pulvis Cuticulor—Formula.—Dr. Unna uses the following powder to which he gives the name "pulvis cuticulor" in the treatment of seborrhœa: Oxide of zinc, 2; magnesium carbonate, 3; white bole, 3; red bole, 2; rice starch, 10.—Pharm. Zeit., Sept. 17, 1898, 668.

SAPONES.

Medicated Soaps—Assay of Medicinal Components.—Dr. A. Schneider recommends the following methods for determining the quality and quantity of the medicinal components of the various medicated soaps:

1. *Insoluble Substances* (Zinc oxide, sulphur, marble, pumice, talc, sand, etc.) : 5 Gm. of the soap are dissolved with the aid of heat in 50 Cc. of water and 50 Cc. of alcohol; the solution is filtered off, and the residue washed, dried and weighed.

2. *Sulphides.*—If the sulphur is present in the form of hepar sulphuris, a little caustic alkali is added to the above proportion of soap, alcohol and water, in order to convert the poly-sulphide into mono-sulphide. The mixture is diluted with water to 400 Cc., the soap is precipitated by the addition of calcium chloride or magnesium sulphate in excess, the whole brought to a volume of 500 Cc. The alkaline sulphide is then estimated in an aliquot portion of the filtrate by means of lead acetate and acetic acid, or colorimetrically by means of potassium nitro-prusside.

3. *Volatile Substances.*—5 Gm. of the soap are dissolved in 100 Cc. of water, the soap is precipitated by means of calcium chloride or magnesium sulphate in excess, and the mixture is distilled with a current of steam. The distillate is shaken out with ether, which on evaporation yields the dissolved substances, such as camphor, thymol, naphthol, phenol, salicyclic acid, etc., as residues.

4. *Substances Soluble in Alcohol.*—5 Gm. of the soap are dissolved in 50 Cc. alcohol, the soap is precipitated by the addition of excess of concentrated solution of calcium chloride, the solution filtered, the residue washed with alcohol, and the alcohol distilled off from the filtrate and washings. The residue so obtained may be tannin, pyrogallic acid, resorcin, etc.; also tar, ichthyol, balsam of Peru, *i. e.* in so far as their more volatile components have not been carried over with the alcohol during the distillation.

5. *Substances Soluble in Water.*—5 Gm. of the soap are dissolved in 500 Cc. of water, the soap is precipitated with calcium chloride and the filtrate tested for the suspected substance—phenol, corrosive sublimate, etc.,—in the usual way.

6. *Chrysophanic Acid.*—The soap is treated as under 5, after addition of 10 Cc. of ammonia water. The filtrate serves for the colorimetric determination of the acid.

7. *Metallic Mercury.*—The soap is dissolved in a little water, the solution decomposed with hydrochloric acid and shaken out with benzin. The further treatment of the residual mercury is the same as in the case of mercurial ointment.

8. *Glycerin*—The soap solution is precipitated with magnesium sulphate, the filtrate is carefully evaporated on a sand-bath, and the residue treated with alcoholic-ether in the well-known manner of glycerin determination.

9. *Lanolin and other Cholestrin Esters* are removed from the so-called super-fatted soaps by carefully washing out their concentrated solutions

(without shaking) with benzin, and evaporating the benzin solution.—Pharm. Centralh., Aug. 18, 1898, 297–299.

Soaps—Value of Boric Acid.—According to F. J. R. Carulla, the value of boric acid in soap depends upon the fact that it destroys its alkalinity, but that, since it cannot remain in a free state in the wash-water when the soap is put into use, it cannot have any antiseptic effect. On the other hand, it is invaluable for the introduction of antiseptics that require freedom from alkali. This principle is recognized by the manufacturer of a popular toilet soap, and has proven very effective. An addition of 5 per cent. of boric acid makes it difficult for soap to lather. It makes it a very lasting and economical soap, however, though that quality can be secured with a much smaller percentage of boric acid, while the reduced quantity benefits the soap in other ways.—Pharm. Journ., May 6, 1899, 403.

Liquid Superfatted Soap—Formula.—Herbert Skinner recommends the following formula for a liquid superfatted soap, which may either be used for the bath or for the exhibition of other dermatological remedial agents: oleic acid, 60.0; alcohol (90 per cent.), 90.0; solution of ammonia, a sufficient quantity; distilled water, enough to make 180.0; vanillin, enough to perfume.—Monath. f. prakt. Derm., 1898, 637.

Tooth Soap—Formula.—Cassini recommends a tooth soap prepared as follows: medicinal soap, 20.0; salicylic acid, 0.5; oil of anise, 1.0; glycerin, carmine, and eosine, of each sufficient. The soap having been colored to suit with carmine and eosine, the anise oil is added, and then the salicylic acid, dissolved in sufficient glycerin to give the resultant mass the consistence of a paste.—Apoth. Ztg., May 17, 1899, 281; from Bull. Commerc., 1899, 179.

SPIRITUS.

Spiritus Saponis—Use as Disinfectant for the Hands, etc.—Prof. J. Mikulicz finds the official spiritus saponatus to serve an excellent purpose for disinfecting the hands and skin. It must be used, however, *without* water. Even previous washing of the hands in water is considered by the author a disadvantage. The soap spirit is to be applied by itself, and allowed to dry. The only disadvantage is that it renders the hands slippery. Its use in this way being intended during operations, etc., it need not be kept on the skin for more than five minutes, and during that period does not effect the skin in the least.—Apoth. Ztg., June 21, 1899, 369; from D. Med. Wochenschr., 1899, 386.

Spirit of Nitrous Ether—Concerning the Purpose of Assay.—R. Fischer and J. A. Anderson, after giving the details of experiments made with several well-known methods proposed for the assay of spirit of nitrous ether, decide in favor of the volumetric process, on account of the easy manipulation and rapidity of the operation, though all the methods tried give the same results when carefully operated. The more important observations of the authors, however, are connected with the purpose of the assay.

They observe that the results obtained indicate a high degree of purity of the washed ether of the pharmacopœial process. If sweet spirit of nitre is intended to be merely an alcoholic solution of ethyl nitrite, the United States Pharmacopœia process must be regarded as highly satisfactory. If, on the other hand, as is contended by some, the by-products of the old process played an important part in the remedy, the question of making a satisfactory preparation of uniform composition becomes more complicated. It might be desirable to experiment on various mixtures of ethyl nitrite and ethyl acetate, with possibly a little aldehyde, as to the therapeutic effects of such mixtures, and a spirit of nitrous ether made official corresponding to the most desirable combination. That is a question, however, which must be settled by the pharmacologist, and not by the pharmaceutical chemist.—Pharm. Archives, Aug. and Sept., 1898, 161–167 and 169–172.

Spiritus Cochleariæ—Preparation from the Dry Herb.—On the basis of comprehensive studies upon the nature and production of the volatile oil of scurvy grass, *cochlearia officinalis*, J. Gadamer suggests that the official (Germ. Ph.) spiritus cochleariæ may be made with advantage from the dry herb, instead of from the fresh drug as officially directed. As in the case of black mustard, the formation of the volatile oil depends upon the reaction of a ferment with a glucoside. This ferment becomes inactive when the plant is dried, or has been kept some time, but is readily replaced by that of white mustard seed. The author therefore proposes the following formula: Four parts of dried scurvy grass and one part of coarsely powdered white mustard are macerated in forty parts of water in a glass retort for three hours; fifteen parts of alcohol are then added, and the mixture is distilled until twenty parts of distillate are obtained. The product is a colorless fluid having a peculiar odor and a burning acrid taste. It is slightly laevo-rotatory and has the specific gravity 0.908 to 0.918. Prepared by this process, as by the strictly official process, spirit of scurvy grass should contain at least 0.0575 per cent. of the volatile oil (butyl-mustard oil) peculiar to the plant, which is quite distinct from natural mustard oil (allyl-mustard oil), as well as from the artificial oil of *cochlearia* (isobutyl mustard oil). To determine the percentage of natural oil of scurvy grass in the spirit, the author directs the following method: 50 Gm. of spiritus cochleariæ are mixed with 10 Cc. of $\frac{N}{10}$ silver nitrate solution and 5 Cc. of ammonia water, and allowed to stand in a well-stoppered 100 Cc. cylinder during 24 hours. After filling up to the mark, 50 Cc. of the clear filtrate, mixed with 4 Cc. of nitric acid, a few drops of solution of ferric sulphate, should not require more than 2.5 Cc. of $\frac{N}{10}$ solution of ammonium sulphocyanate to produce a distinct red coloration. 5 Cc. $\frac{N}{10}$ silver nitrate solution are equal to 0.02875 Gm. of the volatile oil. But, inasmuch as all other mustard oils produce the same reaction, it is necessary to determine the identity of the natural oil of scurvy grass (butyl-mus-

tard oil). This is accomplished by converting the oil into the corresponding thio-urea by means of ammonia, and determining its melting point. To make this plain, it must be mentioned that allylthio-urea (from mustard oil) melts at 72°–74° C.; normal butyl-thio-urea at 79° C.; isobutylthio-urea at 93.5° C., and tert-butyl-thio-urea melted at 165° C., while sec-butyl-thio-urea, which is the compound produced from natural scurvy grass oil, melts at 134°, or if absolutely pure, at 136°–137° C. The identity is therefore determined as follows:

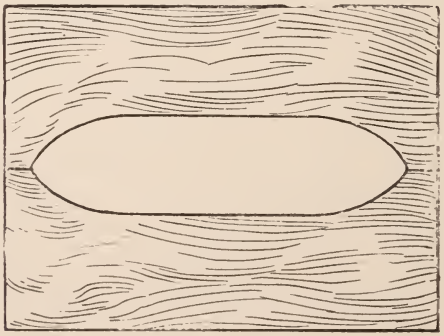
50 Gm. of the spirit are heated on a water-bath with 5 Cc. of ammonia water in a flask provided with a reflux condenser for several hours, then evaporated to dryness, and the residue treated with a small quantity of absolute alcohol, which dissolves the sec-butyl-thio-urea, but leaves the ammonium sulphate formed, as well as the other bodies, undissolved. The alcoholic filtrate is evaporated spontaneously on a watch-glass. The melting point of the purest crystals is then determined. It should be between 125° and 135° C.—Arch. d. Pharm. (1899), *237*, No. 2, 92–110.

SUPPOSITORIES.

Suppositories—Convenient and Accurate Way of Making.—Geo. E. Barksdale describes a suppository shaper made of wood. Two blocks of

FIG. 45.

FIG. 46.



beech wood, 2½ x 6 inches in size and ½ inch in thickness having been secured, one surface of each piece is hollowed out so that an end section looks like Fig. 45, and both together have the appearance of Fig. 46.

This wide groove is tapered from one end to the other so that suppositories of different sizes can be made, the two pieces when placed together forming a cavity shaped like two suppositories placed end to end. Both pieces of wood are planed smooth and polished by rubbing with a small piece of the same wood and a little linseed oil. Two pieces of wood are then screwed on, one on each side of the bottom piece, the edges projecting about 1/8 inch above the surface and serving to keep the upper piece in place as it slides back and forth. The shaper is finished by affixing a handle to the top-piece, and is then used in the following manner: The ingredients are rubbed together on a warm tile until the mass is of stiff pill-like consistency, and the mass is then rolled into a cylinder, using lycopodium to dust with; then cut the cylinder in half as many parts as suppositories are to be made, thus: if four, cut in two parts, and so on. Place a piece of the mass on the bottom piece in the groove, and move the upper piece just as in rolling a pill cylinder. The mass soon assumes a cigar shape, only it is alike at both ends, and when finished it is cut into two equal parts with a heated spatula, two being finished at once. By this means the making of suppositories becomes almost as easy a matter as making pills, and the finished suppositories have a neater appearance than the best hand-made ones. Nor are the ingredients likely to separate as in the moulded suppositories.—Amer. Drug., Oct. 25, 1898, 245.

Glycerin Suppositories, B. P.—Manipulation.—Miss Flora C. Madgsron observes that in making glycerin suppositories by the British Pharmacopœia method there are invariably some pieces of gelatin which remain undissolved and in a hardened condition. To obviate this, place the gelatin in a weighed evaporating dish with sufficient water to cover it, let it stand for two minutes, pour off the excess of water, set aside until the gelatin is quite soft, add the glycerin, and dissolve on the water-bath. If, instead of adding the glycerin to the soaked gelatin before applying heat, the softened gelatin be dissolved on a water-bath in the water of hydration and the glycerin then added gradually, the result is also completely satisfactory, and accomplished without loss of time or material. A point to be observed in dissolving the gelatin is not to stir so vigorously as to introduce air, and consequent frothing. Gentle stirring is all that is necessary.—Pharm. Jour., Nov. 19, 1898, 539; from Proc. Edinb. Chem. Assist. and App. Assoc., Nov. 9, 1898.

Glycerin-Gelatin Suppositories and Pessaries—Formula for Mass.—Crinoss recommends the following method of making suppositories and pessaries, preferring the gelatin solution known in commerce as "colle gélatine cognet extra." The gelatin is first deprived of adherent powder by rubbing it under water with the fingers. It is then dried and weighed. To prepare suppositories the proportions are as follows: Gelatin, washed and dried, 10 Gm.; water, 20 Gm.; glycerin, at 30° C., 50 Gm. For pessaries, 30 Gm. of water are used instead of 20 Gm., because a less rigid

body is desired. In either case, the gelatin is first soaked in the water, and when this has been taken up, it is transferred to the glycerin, in which it rapidly dissolves. The moulds are oiled with liquid paraffin, and the mixture sets perfectly in an hour. It is claimed for this method that, by the avoidance of directly heating the gelatin, the latter does not lose its cohesiveness. When a soluble substance has to be incorporated, one-third of the distilled water is reserved to dissolve it, and the solution is added to the gelatin mixture just before pouring into moulds.—Pharm. Journ., Nov. 12, 1898, 505; from Rép. de Pharm., x, 433.

Ichthyol Pessaries—Gelatin Basis Unsuitable.—A. K. Stewart calls attention to frequent complaints by medical men that they have found pessaries containing 15 per cent. of ichthyol, as frequently dispensed, to be quite infusible and insoluble. In every instance complained of, the pessaries were found to have been made with a gelatin basis. While the pessaries made with this basis are easily made and present an elegant appearance, the mass is tough and almost insoluble, the insolubility varying apparently in proportion to the heat employed in the process of preparation. The gelatin basis is, therefore, quite unsuitable. The author finds that with 15 per cent. of ichthyol a perfectly satisfactory and readily soluble (fusible, Rep.) pessary may be made with oil of theobroma alone. The addition of beeswax, as recommended by Martindale to raise the melting point, is not found to be necessary.—Pharm. Journ., March 18, 1899, 260.

Bougies—Simple Method of Making.—The following method for preparing bougies is recommended by de Toledo: The drug is massed in the ordinary way with acacia and honey so as to form a stiff mass, which is weighed into the required number of pieces and rolled out into cylinders on the pill machine. In the mean while equal parts of white wax and cacao butter are melted together in a test tube; the bougies are impaled on a needle, plunged into the melted mixture, withdrawn, and cooled on a plate. A firm and efficient bougie is thus obtained expeditiously.—Pharm. Journ., Sept. 24, 1898, 345; from L'Union Pharm., xxxix., 337.

Urethral Bougies—New Basis.—Soulard proposes a basis for preparing urethral bougies which combines the advantages of suppleness and softening at the body temperature without undergoing complete liquefaction. It is composed of cacao butter, 2; lanolin, 1; white wax, 1. These are melted together and the mass is preserved for medication as required. For moulding the following simple method is employed: An iron rod 3 Mm. in diameter and 20 Mm. long, provided with a cross-piece for a handle, is used as a plunger for a number of glass tubes into which it fits. The medicated basis having been melted, it is aspirated into the tubes by the aid of a piece of rubber tubing by suction, and after two minutes, before the mass has time to set hard, the bougie is forced out by means of the iron rod. With a supply of eight or ten tubes of suitable length, any number

of bougies may be rapidly made.—Pharm. Journ., Oct. 22, 1898, 437 ; from Bull. Soc. de Pharm. de Bord., xxxviii., 136.

SYRUPI.

Medicinal Syrups—Inversion of Cane Sugar.—F. W. Haussmann, in connection with preliminary pharmacopœial work, has investigated the question of the extent to which cane sugar, which has become inverted in medicinal syrups from various causes, affects them unfavorably. He finds that by the presence of directly fermentable sugar in acid syrups, a favorable condition for the liability of rapid fermentation must be taken into consideration. Such syrups, therefore, require special attention by the pharmacist concerning their preservation ; while the physician, also, is confronted by an analagous difficulty, namely, the likelihood of rapid decomposition in the stomach with consequent gastric disturbances. The author's paper covers a large number of experiments, which see in Amer. Journ. Pharm., Dec., 1898, 585–595.

Reviewing Mr. Haussmann's paper on the inversion of cane sugar in official syrups, Louis Kahlenberg points out that, while recognizing the importance of the observations and experiments, the general results obtained by that author are such as could have been foretold. The inversion progresses most rapidly in those syrups that contain strong mineral acids. Where organic acids only are present, the inversion is less rapid, and finally in neutral or alkaline syrups the inversion is practically nil. This is in perfect harmony with the classical researches of Ostwald and others. As regards Mr. Haussmann's fears that the invert sugar in official syrups will cause gastric disturbances, this, in view of the facts that the digestive secretions themselves change starch to fermentable sugar, that many of our foods contain such sugar, and that invert sugar is consumed in preserves, lemonade, etc., need hardly be entertained.—Pharm. Review, Jan., 1899, 10–12.

Medicinal Syrups—Criticism of Several Formulas.—The Committee on Pharmacy of the Maryland Pharmaceutical Association reports favorably on the formulas for syrup of iodide of iron and syrup of tar, proposed by Dr. Dohme at the meeting in 1897. With reference to

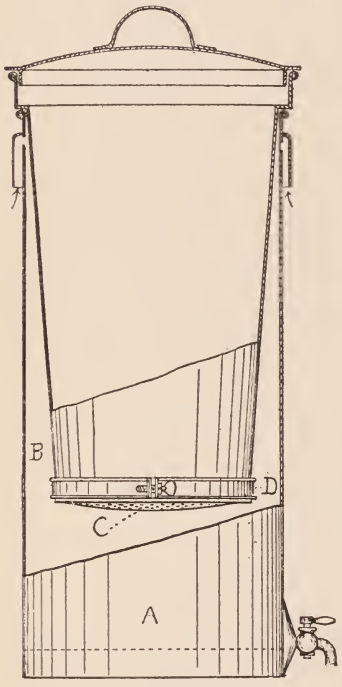
Syrup of Iodide of Iron (see Proceedings 1898, 728), they observe that the formula is an undoubted success, yielding a stable preparation of a delicate green color. The only improvement suggested is one of manipulation, and consists in adding—in the proportion of the formula—about 50 Gm. sugar to the iodine, iron and water while reacting on each other. — Proc. Md. Pharm. Asso., 1898, 74.

Syrups—Mould due to Penicillium glaucum.—L. Krauss has examined the moulds formed in numerous medicinal syrups microscopically, and finds them to be uniformly due to *Penicillium glaucum.* Simple syrup prepared strictly in accordance with the official requirements gave evi-

dence of abundant fungous growth after several weeks, and, though incapable of reducing Fehling's Solution when first made, rapidly reduced it after the mould had formed. Syrup of Senega appeared to keep better than any of the other medicinal syrups—doubtless owing to the small quantities of salicylic acid derived from the methyl salicyclate contained in senega root.—Pharm. Centralh., Oct. 13, 1898, 737.

Syrup—Apparatus for Preparation by Percolation.—S. T. Hensel has constructed the apparatus shown by Fig. 46 for preparing syrup by percolation, which enables its manufacture on a large scale with convenience, and for cleanliness, economy, efficiency, and speed, is unsurpassed by any device that has so far been met with by him; at the same time the cost of the apparatus is so slight as to place it within the reach of all. It consists of a cylindrical receiver made of heavy galvanized iron (*A*), of a capacity of 15 gallons, 29 inches in height, and 13 inches in diameter; into it is closely fitted a percolator (*B*), 13 inches in diameter at the top and 10 inches at the bottom, and 20 inches in height. The mouth of the percolator is provided with a perforated diaphragm (*C*), an extension (*D*) beyond the diaphragm for the reception of a steel band or loop, which may be tightened or loosened by means of a thumbscrew and into which may be adjusted a flannel strainer. The width of the mouth of the percolator is intended to provide for the rapid delivery of the product, and it is in strict conformity with Pascal's well-known law, namely: "Pressure, exerted anywhere upon a mass of liquid, is transmitted, undiminished, in all directions, and acts with the same force on all equal surfaces and in all directions at right angles with those surfaces." It is not necessary to dwell on its operations, except to say that in charging the apparatus it is better to reverse the order; that is to say, after having introduced about 10 pounds of sugar, pour about 3 gallons of water into the percolator along a 1½-inch round stick. This will prevent the inconvenient dislodgment of the sugar. Then the remainder of the sugar is gradually added by gently shaking the scoop and distributing it as uniformly as possible, adding the sugar until there remains about four inches of water above the sugar. The object of this is to get rid of the air

FIG. 46.



Syrup Apparatus.

filling the interstices between the granules of the sugar, which would otherwise prove a source of annoyance by bubbling up through the mass, creating little fissures through which would descend the unsaturated solution.—Merck's Rep., Oct. 1, 1898, 628.

Syrupus Rhei, U. S. Pharm.—Proposed Modification of Formula.—F. W. Haussmann finds that the official formula and process for preparing syrup of rhubarb yields an unstable preparation, and proposes the following modification which, in his experience, yields a more sightly and stable product: Mix together 100 Cc. of fluid extract of rhubarb and 4 Cc. of spirit of cinnamon, add a solution of 10 Gm. of potassium carbonate in 375 Cc. of water, and allow the mixture to stand for two hours with occasional agitation; then filter, pass enough water through the filter to bring the measure to 475 Cc., and in this dissolve 750 Gm. of sugar by agitation and without heat. Finally strain and add enough water to make 1,000 Cc. of finished syrup.—Amer. Journ. Pharm., June, 1899, 267–268.

Syrupus Rhei, Br. Ph.—Modification of the Official Process.—E. W. Lucas states that exception has been taken to the official method of preparing syrup of rhubarb, on the ground of wastefulness in alcohol and loss in aroma. The results of experiments, undertaken with the view to remedying these defects, lead him to suggest the following method and process: Macerate 2 ozs. of rhubarb, cut small, in 12 fl. ozs. of distilled water for 12 hours, strain, press and filter on to 24 ozs. of refined sugar. Dissolve by gentle heat and add 5 minims of oil of coriander and 1 fl. drachm of rectified spirit. Finally adjust the specific gravity by the addition of water to 1.315. The product is about 2 lbs. 10 ozs., and is of good color and aroma. Another syrup which requires a modification in the process of preparation is

Syrupus Pruni Virginianæ.—The author finds the percolation of the bark to be very tedious (? Rep.), and that in hot weather the percolate is liable to deposit and lose aroma before the process is completed. He therefore recommends that 6 Gr. of wild cherry bark, in No. 20 powder, be macerated in 14 fl. ozs. of distilled water for 12 hours, strongly expressed, and the expressed liquid reserved. The dregs are macerated with 8 fl. ozs. more of water for 4 hours, and expressed as before. The united liquids are then filtered on to 30 ozs. of sugar and 2½ fl. ozs. of glycerin, the sugar is dissolved without heat, and sufficient water is added to make 2 pints (Imp. Meas.) finished product.—Pharm. Journ., June 10, 1899, 526.

Acetous Syrup of Wild Cherry—Formula and Advantages.—Joseph P. Remington suggests the following formula for preparing an acetous syrup of wild cherry, which he believes possesses some advantages over the official syrup, particularly in that the astringency is greatly modified:

Moisten 150 Gm. of wild cherry in No. 20 powder, with 50 Cc. of diluted acetic acid, U. S. Ph.; macerate for twenty-four hours in a close glass or earthenware vessel, pack in a non-metallic percolator, and percolate with diluted acetic acid into a receiver containing 150 Cc. of glycerin until 450 Cc. of liquid are obtained. In this dissolve 700 Gm. of sugar without heat, strain, and pass enough diluted acetic acid through the strainer to make 1000 Cc. of finished syrup. The product is light reddish-brown, has the characteristic peach-kernel flavor, and a decidedly agreeable, acidulous taste.—Amer. Journ. Pharm., May, 1899, 209–210.

Syrup of Tolu—Changes Observed by Age.—Ed. Crouzel has repeatedly observed that syrup of tolu, if not prepared with pure sugar and carefully clarified, assumes an unpleasant odor, reminding of illuminating gas. The author endeavors to explain this by assuming that the cinnamic acid of the tolu is primarily split into carbonic anhydride (CO_2) and styrol (C_8H_8) and that this is subsequently split up into benzol and acetylene. The decomposition of the cinnamic acid may also be direct into carbonic acid and acetylene, according to the equation—$C_9H_8O_2 = CO_2 + 4C_2H_2$—by the influence of micro-organisms.—Apoth. Ztg., May 6, 1899, 251; form Rép. de Pharm., 1899, 147.

Syrupus Althaeæ—Improved Formula.—F. W. Haussmann, as a member of Research Committee E, Pharmacopœia Revision, recommends the following modification of the official process for preparing syrup of marshmallow: Althæa, cut into small pieces, 50 Gm.; alcohol, 30 Cc.; sugar, 750 Gm.; water, sufficient to make 1000 Cc. Wash the althæa with cold water, then macerate it with 400 Cc. of water, previously mixed with the alcohol, during three hours, stirring frequently, and strain without expression. Heat the infusion to boiling, add 10 Gm. of purified talcum, and filter while hot, passing a sufficient quantity of boiling water through the filter to measure 400 Cc. Add the sugar to the filtrate, heat to boiling, remove the scum and strain. When cold add sufficient water to make the product measure 1000 Cc. Keep the syrup in completely filled bottles in a cool place. The syrup so obtained keeps well, and is the outcome of a number of experiments. The author also suggests the following modification of the official formula and process for preparing

Syrupus Acaciæ: Acacia, granulated, 8.5 Gm.; sugar, 20 Gm.; distilled water, 25 Cc.; syrup, sufficient to make 100 Cc. Mix the sugar with the acacia and add to the distilled water, previously warmed in a capsule. Stir until dissolved, continuing a gentle heat. Finally add a sufficient quantity of syrup to make the product measure 100 Cc.—Amer. Jour. Pharm., April, 1899, 153–157.

Syrup of Hydriodic Acid—Modification of U. S. P. Formula.—F. W. Haussmann critically reviews the conditions that interfere with the production of a uniformly satisfactory syrup of hydriodic acid by the process

of the United States Pharmacopœia, as well as the various remedies that have been proposed from time to time. He finds that a slight increase in the proportion of potassium iodide and tartaric acid is necessary to produce, as is designed by the Pharmacopœia, a 1 per cent. syrup of hydriodic acid. The prolonged washing of the precipitated potassic bitartrate is objectionable and wasteful; the washing out of the hydriodic acid with diluted should be continued until a definite volume of solution is obtained, this diluted alcohol with water *without previous evaporation of the alcohol*, and the sugar dissolved without heat. The formula proposed is as follows: Potassium iodide, 13.5 Gm.; potassium hypophosphite, 1 Gm.; tartaric acid, 12.5 Gm,; sugar, 625 Gm.; diluted alcohol, water, of each, sufficient to make 1000 Gm. Dissolve the two potassium salts in 15 Cc. of water, and the tartaric acid in 25 Cc. of diluted alcohol; mix the two solutions, shake, and place in ice-water for half an hour, occasionally shaking. Filter through a small, rapid-acting white filter into a bottle graduated to 75 Cc., carefully allow the liquid to drain, and wash with small successive portions of diluted alcohol until the requisite quantity of filtrate (75 Cc. (?) Rep.) is obtained. Dilute this with 275 Cc. of water, add the sugar, dissolve by agitation without heat, and bring the measure to 1000 Gm. by the addition of sufficient water. The addition of the acid filtrate to the previously prepared syrup will answer equally well, and is more expeditious. To restore syrup of hydriodic acid which has become colored, the author recommends shaking with 3 to 5 per cent. of *purified* animal charcoal and filtration.—Am. Jour. Pharm., March, 1899, 121–130.

Syrup of Hydriodic Acid—Purity of Ingredients Essential to Stability.—Edwin H. Wells, speaking of the trouble experienced with syrup of hydriodic acid in that, as ordinarily prepared, it is quite liable to become colored, observes that this color is sometimes doubtless due to liberation of iodine, but in his own experience it seems to far oftener result from the action of the acid on impurities in the sugar or on the sugar itself. Syrup of hydriodic acid prepared from pure materials by the United States Pharmacopœia process, but using a light syrup—650 Gm to make 1 liter—made from pure white rock candy crystals, has been kept by him for months in partly-filled bottles exposed to light and with occasional opening. Heat, however, causes the syrup to acquire color, and it should not, therefore, be kept in a warm place.—Alumni Report, May, 1899, 83.

Chocolate Syrup—Good Formula for Hot Soda.—W. A. Dawson recommends the following formula for preparing chocolate syrup for hot soda water, which, in an experience of many years, he finds to give good satisfaction:

Powdered chocolate	1 pound.
Boiling water	1 pint.
Syrup-saturated, or rock candy syrup	7 pints.

Put the chocolate in an enameled or agate-ware vessel, and add a pint of the syrup. Stir until perfectly smooth and free from lumps. Then add the pint of boiling water and place the vessel in a water bath, and bring the chocolate mixture to a boil. Stir occasionally, and, after removing from the fire, add the balance of the syrup. When cool add one ounce of vanilla extract. The chocolate used should be in impalpable powder and free from fat. The author uses Baker's Cocoa or Baker's Soluble Chocolate. Such chocolate contains about 10 per cent. of natural starch, and unless the chocolate is boiled enough to cook this starch, the chocolate syrup will lack body and richness and will be "gritty" and separate on standing. Chocolate syrup should not be strained. It does not require straining if well made. If it should be lumpy, however, a wire tea-strainer may be used.—Amer. Drugg., Jan. 10, 1899, 3.

Chocolate Syrup—A Good Formula.—Alfred I. Cohen recommends the following formula as furnishing a nice, permanent and homogenous syrup of chocolate: Soak 1 oz. of fine French gelatin in cold water until it has ceased to swell; place it, together with ½ lb. of bitter chocolate (Baker's, Huyler's, or other suitable brand) and 8 fl. ozs. of glycerin, in a large evaporating dish, and heat on a steam bath. As soon as the chocolate has melted, stir well, and add, slowly at first and with constant stirring, sufficient *hot* simple syrup to make one gal. of finished product. Vanilla flavoring may be added to suit—2 fl. dr. to a pint being sufficient.—Merck's Rep., March, 1899, 106.

Compound Syrup of Tar—Formula.—"Sam Bucus" communicates the following formula for a compound syrup of tar which excels in efficiency, appearance and taste: Powder ½ ounce of magnesium carbonate and incorporate with 4 ounces of tar; triturate with 1 ounce of ether, then with 1 ounce of alcohol, and finally with 1 pint of vinegar of squill. Allow the mixture to stand twelve hours; then pour on a wetted filter, dissolve 20 ounces of sugar in the filtrate, then 16 grains of tartar emetic, and make up the finished product to two pints (with water (?) Rep.). With this syrup a

Sprup of Tar and Wild Cherry may be prepared, as follows: Compound syrup of tar, 2 ounces; syrup of wild cherry, camphorated tincture of opium, of each, 1 ounce.—Bull. Pharm., Jan., 1899, 12.

Cough Syrup—Formulas.—A. E. Hiss recommends the following formulas for cough syrups which he has found quite efficient. For adults he recommends a

Compound Syrup of White Pine, as follows:

White pine bark	8 ounces av.
Wild cherry bark	8 ounces av.
Balm of Gilead buds	1 ounce av.
Spikenard	1 ounce av.

Blood-root	¾ ounce av.
Sassafras bark	½ ounce av.
Morphine sulphate	24 grains
Chloroform	½ fluidounce.
Glycerin	20 fluidounces.
Sugar	90 ounces av.
Water	q. s. ad 1 gallon.

Mix the glycerin with 40 fluidounces of water and use this as the first menstruum. Also mix the first six ingredients, reduce to moderately coarse powder, moisten with the menstruum, macerate for twenty-four hours in a closed vessel, then pack in a percolator, saturate with menstruum, macerate for another twenty-four hours, then pass the remainder of the menstruum through the drug, and continue percolation with water until 70 fluidounces of liquid are obtained. In this dissolve the morphine sulphate and chloroform, and then the sugar, by agitation without heat, strain, and pass enough water through the strainer to make the liquid measure one gallon. A

Cough Syrup for Children is prepared according to the following formula:

Chloroform	1 fluidounce.
Paregoric	8 fluidounces.
Syrup of ipecac	6 fluidounces.
Hive syrup	8 fluidounces.
Syrup of wild cherry	40 fluidounces.
Solution of ammonium chloride (1 in 4)	16 fluidounces.
Syrup of licorice	sufficient to make 1 gallon.

The directions for the first are a teaspoonful for adults every two or three hours; the second may be given at the rate of a teaspoonful to children six years old every two or three hours.—Bull. Pharm., Aug. 1898, 344.

Laxative Prune Syrup — Formula.— Frank Edel recommends the following formula for preparing a "Laxative Prune Syrup": Take 2 pounds of good prunes and water enough to make 5 pints, boil for fifteen or twenty minutes, and to this, when strained, add 5 pounds of sugar and 1 pound each of modified non-bitter extract of cascara sagrada, and aqueous fluid extract of senna, and flavor with a few drops of oil of coriander and peppermint. While this yields a good preparation, it may be improved by adding 1 drachm of saccharin and enough simple syrup to make 1½ gallons. This will be found an excellent laxative syrup.—West. Drug., Dec. 1898, 547.

Cathartic Syrup—Formula.—A. E. Hiss recommends a cathartic syrup which is pleasant to the taste, acts without griping, and is suitable for adults and children, the purgative adult dose being one tablespoonful. The formula is as follows: Buckthorn, senna, Rochelle salt, of each 6 ozs.

av.; sodium bicarbonate, ¾ oz. av.; sugar, 2½ pounds; oil of anise, 40 drops; oil of wintergreen, 20 drops; oil of peppermint, 10 drops; water, q. s. Heat 52 fluidounces of water to boiling, add the buckthorn and senna, set aside until cooled below 60° C., then heat to a temperrature between 60° and 65° C. for two hours, strain with expression, adding hot water through the strainer to make the liquid measure 36 fluidounces. To the latter add the sodium bicarbonate, sugar and salt, and agitate, preferably in a warm place, frequently until all are dissolved. Dissolve 20 grains of salicylic acid in 1½ fluid ounces of alcohol, add the oils to this solution, then add this solution to the syrupy liquid, finally add enough simple syrup, if necessary, to make ½ gallon of product, and strain. Allow to stand for several days, a week or more if possible, to allow suspended matter to subside—there will always be subsidence in this preparation—and bottle the clear supernatant liquid. The salicylic acid is added for the purpose of insuring permanency of the preparation.—Bull. Pharm., Aug. 1898, 343.

Syrup of Thyme—A Remedy for Whooping Cough, etc.—Dr. Ernst Fischer directs attention to a syrup of thyme, introduced under the name of

Pertussin by Taeschner, which is made by adding syrup to a fluid extract of German thyme in such proportion that the resulting preparation has the strength of an infusion, 1 : 7. The author recommends this remedy as efficient in the treatment of whooping cough as well as in other ailments of the respiratory organs. A syrup very similar in taste and effect may be obtained by mixing simple syrup with oil of thyme; but the latter has a slightly irritating effect upon the throat, and is by some individuals not borne well upon the stomach.—Apoth. Ztg., July 16, 1898, 498; from D. Med. Wochenschr., 1898, Ther. Beil., 50.

TABELLÆ.

Compressed Tablets—German Enactments Prohibiting the Dispensing of the Product of Manufacturers.—Attention is drawn in "Apoth. Ztg." (March 15, 1899, 132) to recent legal enactments in Baden, Brunswick, Hamburg and Prussia, prohibiting pharmacists from dispensing medicinal compressed tablets procured from manufacturers, and it is presumed that similar enactments will follow in other German states. This has given an impetus to the invention and construction of tablet compressors suitable for the dispensing counter, and among them the apparatus shown in the accompanying cut (Fig. 47), appears to have been received very favorably. In this compressor (manufactured by Keyl, in Dresden), the pressure is exerted by the lower die, which is raised and lowered by the simple turn of the handle attached to a ratchet. The die having been lowered to the full

FIG. 46.

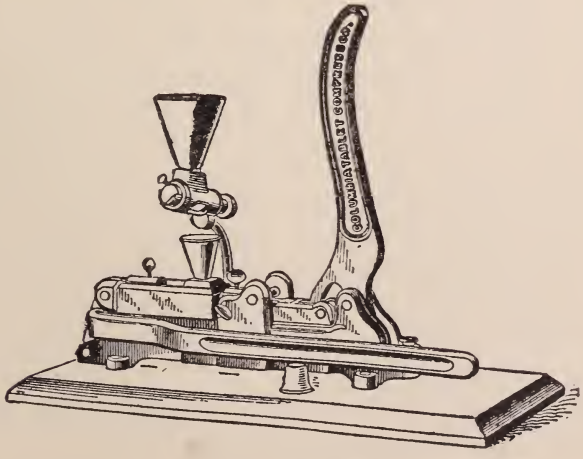
extent, the powder is poured into the mould through the movable funnel shown in the cut, the funnel is withdrawn, and replaced by the upper die, which is securely clamped on by a simple twist. A forcible turn of the handle then compresses the powder, and removing the upper die leaves the tablet ready for transfer to its container. Dr. Schweissinger speaks highly of the utility of this little apparatus for the intended purpose, which further recommends itself by compactness and cheapness.—See Pharm. Centralh., March 2, 1899, 131.

Tablet Compressor—Simple Construction for the Dispensing Counter.—The firm of Kahnemann and Krause, Vienna, manufacture the simple form of tablet compressor shown by Fig. 48, which, it is stated, efficiently and expeditiously enables the preparation of compressed tablets. Each compressor is provided with three sets of dies, for ¼, ½, and 1 gramme tablets, which are easily removed and readjusted. The powder, which should not be too fine, is poured into the mould by means of a slip of card-board or a spoon, and the tablet is formed by one or more blows with the flat of the hand upon the button —the die being lifted automatically by a spring, while the tablet is expelled by means of the small lever extending from beneath the apparatus. —Apoth. Ztg., Feb. 8, 1899, 72.

Fig. 48.

Tablet Compressor—A Useful Form.—Among the many tablet com-

Fig. 49.



Tablet Compressor.

pressors that have been proposed in recent years, the one known as the "Columbia Tablet Compressor" possesses some advantages to the retail

pharmacist. The powder being weighed off, it is put into the small hopper, and the lever, which is shown in the cut (Fig. 49) standing up, is pressed down, the degree of compression being controlled by a gauge which retards the lever. After compression the tablet is ejected by raising the straight lever, which is shown at the side of the figure. (This compressor serves admirably at the dispensing counter, for which it is intended. Rep.)—Chem. and Drug., Nov. 19, 1898, 834.

Compressed Tablets—Various Formulas.—Owing to legal enactments prohibiting the dispensing of manufactured tablets by the pharmacists of certain German states, already referred to, the question of their convenient preparation at the dispensing counter has become an important one. The "Apoth. Ztg." (April 8, 1899, 185–186) gives some instruction concerning their preparation, on points which are sufficiently familiar to American pharmacists, and submits the following formulas, which may be useful for reference:

Acidum Citricum 0.6: Acid. citric., 600; sacch. lact., 1.25; talcum, 3.5. To make 1000 tablets, each weighing 0.7 Gm. The citric acid is dried at 100° to constant weight, and then incorporated with the other ingredients.

Acidum salicylicum 0.5: Acid. salicyl., 500; sacch. lact., 100; amyl. tritici, 25; talcum, 25. To make 1000 tablets, each weighing 0.65 Gm.

Acidum Tannicum 0.06: Acid. tannic., 60; sacch. lact., 400; amylum tritici, 20; talcum, 20. To make 1000 tablets, each weighing 0.5 Gm.

Antifebrinum 0.3: Antifebrin, 300; sacch. lact., 160; amylum tritici, 20; talcum, 20. To make 1000 tablets, each weighing 0.5 Gm.

Antipyrinum 0.5: Antipyrin, 500; sacch. lact., 200. To make 1000 tablets, each weighing 0.7 Gm.

Chininum Sulphuricum 0.3: Quinine sulph., 300; sacch. lact., 125; mixt. sulph. acida, 15; amylum tritici, 50; talcum, 50. To make 1000 tablets, each weighing 0.5 Gm. The quinine salt and acid mixture are triturated together, dried, sifted, and added to the other ingredients.

Hydrargyrum Chloratum 0.2: Hydrargyrum chlor. mite, 200; sacch. lact., 250; amylum tritici, 165; talcum, 80; *Cinnabar*, (? Rep.) 5. To make 1000 tablets, each weighing 0.7 Gm. The cinnabar is directed to be triturated to extreme fineness with the milk sugar and starch.

Morphinum Hydrochloricum 0.01: Morphinum hydrochlor., 10; sacch. lact., 465; talcum, 25; *aniline blue*, water soluble, 1. To make 1000 tablets, each weighing 0.5 Gm.

Natrium Bicarbonicum 1.0:—Natrium bicarbon., 1,000; sacch. lact., 100. To make 1,000 tablets, each weighing 1.1 Gm.

Natrium Carbonicum 0.5: Natrium carbon. sicc. (Germ. Pharm.) 500; talcum, 50. To make 1,000 tablets, each weighing 0.55 Gm., and representing 1 Gm. of crystallized sodium carbonate.

Opium, 0.06: Opium pulv., 60; sacch. lact., 400; amylum, 20; talcum, 40. To make 1,000 tablets, each weighing 0.5 Gm.

Phenacetinum, 0.5: Phenacetinum, 500; sacch. lact., 100; amylum tritici, 50; talcum, 50. To make 1,000 tablets, each weighing 0.7 Gm.

Pulvis Ipecacuanhæ Opiatus, 0.6: To be made direct from the powder (Dover's Powder), each tablet to weigh 0.6 Gm.

Pulvis Ipecacuanhæ Stibiatus, 0.65.—To be made direct from the powder (ipecac 19.0, tartar emetic 1.0) prescribed by the "Army Sanitary Regulations," each tablet to weigh 0.65 Gm., but better with the addition of 0.2 Gm. of cane sugar. Two tablets correspond to one emetic powder of the Army Sanitary Regulations.

Radix Rhei, 0.5: Radix rhei, 500; sacch. lact., 20; talcum, 30. To make 1,000 tablets, each weighing 0.55 Gm.

Tablettæ Solventes: Ammon. chlor., 200; succ. liquirit. dep. sicc., 200; sacch. lact., 80; talcum, 80; amylum, 40; benzoin pulv., 10. To make 1,000 tablets, each weighing 0.6 Gm.

Hypodermic Tablets—Analyses of Several Commercial Combinations.—The frequent assertion that the hypodermic tablets of the market are not reliably prepared has induced A. Gabriel Touchet to subject hypodermic tablets of aconitine (*a* 0.00025 Gm.), quinine hydrobromide (*a* 0.03 Gm.), and caffeine sodio-salicylate (*a* 0.03 Gm.), to chemical examination. He found the aconitine tablets to contain 0.00031 Gm. of aconitine, and determined the physiological activity of the alkaloid. The high number obtained he attributes to the faulty method employed. The quinine hydrobromide tablets contained 0.0292 Gm. of the salt, while the caffeine sodio-salicylate tablets yielded 0.0225 Gm. caffeine, whereas, the proper proportion of that alkaloid would be 0.0164 Gm. This result he also attributes to faulty methods, which appear to have been unavoidable. In all cases the physiological experiments proved the satisfactory physiological activity of the medicaments separated.—Apoth. Ztg., April 5, 1899, 179; from Annal. de Pharm., *4*, 375–380.

Chocolate Tablets—Commercial Method of Preparation.—Alfred I. Cohen, in an interesting review of chocolate, its source and pharmaceutical uses, gives the following method by which various medicaments may be exhibited in the form of a plano-convex chocolate tablet: The base of the tablet consists of a mixture of the bitter chocolate of the market (Baker's, Huyler's, or other brand of equal quality) and finely powdered sugar, in the proportion of 5 of chocolate and 6 of sugar. The selected remedy is first triturated with the sugar, the quantity of the latter being decreased in proportion as the quantity of drug used is increased. The triturate is then placed with the chocolate into a casserole or a porcelain evaporating-dish or mortar, and placed on a steam bath. A soft mass soon forms, which may be rolled and divided into suitable sections, each

of which may in turn be subdivided with a knife into equal portions. The latter are slightly rolled, and placed at equal distances apart on a sheet of tinned iron, previously oiled with almond, peanut, or other bland oil. On now slightly tapping the tin or slapping it gently on the table, the portions of mass flatten out and assume a hemispherical shape. The tin is now set aside in a cold place, to allow the tablets to harden, when they may be readily removed by slightly bending the tin. If sheets of tin are not available, a board or piece of pasteboard covered with waxed or oiled paper will answer. The bulk of the mass must be kept warm while the pieces are being formed, and the manipulations must be accomplished with a certain degree of celerity in order to avoid the too rapid hardening of the pieces before they have been given their final shape.

The tablets made as above are very attractive in appearance and pleasant in taste; but they may be further improved, if desired, by adding some flavoring (such as vanilla) to the mass while still warm. The writer is confident that an excellent trade may be built up for these tablets by the enterprising pharmacist who will make a line of them and exhibit them to his customers and his medical friends. Worm lozenges (santonin or sodium santoninate), iron tablets (iron carbonate), febrifuge tablets (antipyrine, phenacetin, or quinine tannate), anti-rheumatic tablets (salol, or salol and phenacetin), etc., are in more or less steady demand all the time.—Merck's Rep., March, 1899, 105.

Pastilles for Heartburn—An Efficient Formula.—F. Pentzoldt observes that calcined magnesia is preferable to a mixture of it with sodium bicarbonate commonly employed. It is conveniently exhibited in the form of compressed tablets containing 0.5 Gm. each; but these are generally so hard that they can disintegrate but slowly in the stomach. He has therefore formed the magnesia into pastilles with the addition of borax, &c., which very efficiently promotes the disintegration of the remedy in the mouth or stomach. The prescription is as follows: Magnes. ust, 22.5; borax, 5.0; gummi arabic., 2.5; glycerin, gtt. L.; lemon water (containing one-half drop oil of lemon), 8.0. M. f. past. No. LX.—Apoth. Ztg., 1899, 9; from Klin.-Therap. Wchschr., 1898, 1820.

TINCTURÆ.

"Percolates"—A New Name for 50 per cent. Tinctures.—Professor Wm. J. Jackson suggests the name "percolates" as a distinctive title for 50 per cent. tinctures if such should be admitted into the United States Pharmacopœia at a future revision, as is proposed by a committee of the American Pharmaceutical Association in its report on the revision of the Pharmacopœia. Professor Jackson observes that the process of manufacture of these "percolates" would, in all probability, follow the general lines laid down for the manufacture of the fluid extracts, excepting that 500 Gm. of the drug would be sufficient to make 1,000 Cc. of the percolate. The

menstruum used would correspond to that used for the fluid extracts, viz.: Alcohol, alcohol and water (in various proportions), glycerin and alcohol, and glycerin, alcohol and water. There seems to be no valid reason why this new class of preparations should not be established as recommended by the Revision Committee. While there is little or nothing to be said against such a class of remedies, there is much to say in its favor. To recapitulate: The establishment of a class of preparations such as the "percolates" would bring pharmacy one step nearer to being an exact science. It would reduce the number of official preparations by twenty-seven. It would give us a list of medicaments of a uniform and definite strength. It would simplify the estimation of dosage. It would lessen work in the laboratory and thus be a factor in economy, and, lastly, it would give the physician a separate and distinct class of popular and efficient remedies, easily understood, easily dispensed and easily obtained. —Amer. Drug., April 10, 1899, 193.

Tinctures, U. S. P.—Shorter Processes.—F. W. E. Stedem calls attention to some official methods for preparing certain tinctures which can be modified and shortened with advantage.

Tincture of Asafetida can readily be made by percolation, instead of maceration alone. The selected drug is reduced to a coarse powder, introduced into a percolator in the usual way, alcohol is added in suitable quantity, and, after macerating for forty-eight hours, it is percolated.

Tincture of Calumba, which gives much trouble when the official directions are followed, is readily prepared if the drug is reduced to No. 20 powder, placed loosely into the percolator *without* previous moistening, and then percolating with the official menstruum.

Tincture of Guaiac and *Ammoniated Tincture of Guaiac* are readily made by reducing the selected resin to a fine powder and adding the necessary menstruum gradually, triturating constantly, then filtering, and washing the filter with some of the menstruum reserved for this purpose.

Tincture of Iodine, on the other hand, is most conveniently made by percolation. Reduce the iodine to a uniform coarse powder, place it in a glass funnel plugged with absorbent cotton upon which a layer of white filter paper is placed, and pour on alcohol in small quantities at a time until the required quantity of tincture is obtained. If necessary, the tincture may be poured through the plug once more to dissolve any remaining iodine.

Tincture of Myrrh is also most conveniently made by percolation. The drug is reduced to a uniform (No. 16 to 18) coarse powder, placed dry into the percolator, and, after twenty-four hours' maceration, percolated, slowly at first, more rapidly towards the end.—Amer. Journ. Pharm., April, 1899, 162–163.

Homeopathic Tinctures—Preparation by Percolation.—Dr. J. Katz, after

comprehensive experiments, recommends the preparation of homeopathic tinctures by the process of percolation. Complete extraction of the drug is secured by this method of 1 p. of drug with 5 p. alcohol.—Pharm. Centralh., July 7, 1898, 486.

Tincture of Guaiacum—Observations Concerning Its Value as a Reagent for Blood.—Pierre Breteau observes that tincture of guaiacum gives a blue color not alone with blood, but with many other substances also, such as copper sulphate, prussic acid, phosphorus, etc. It therefore loses much of its importance as a reagent, and unless experimental conditions are clearly laid down and strictly adhered to, a wide difference in its behavior will be noted. Thus in Van Deen's method of determining small quantities of blood by the use of tincture of guaiacum, the smallest trace of copper in the distilled water employed appreciably affects the results. One part of the copper sulphate in 500,000 parts of water will strike a blue color with tincture of guaiacum, slowly in the cold, but more rapidly at 40° C.—Pharm. Jour., July 30, 1898, 97; from Jour. de Pharm. et Chin., 1898, 569.

Tincture of Opium—Use of Granulated Opium for its Preparation.—H. B. Kohl and Prof. L. E. Sayre give the results of experiments made to obviate, if practicable, the use of calcium phosphate in the preparation of the official tincture of opium. They find that if granulated opium is used, instead of the fine powder directed officially, the process is not alone expedited, but the extraction of morphine is more complete and effectual. Experiments were made following the official process, using granulated opium by itself, and using the latter together with talcum and with pumice in place of precipitated calcium phosphate. The results are as follows:

No. Process Used.	Percentage Morphine in Drug.	Percentage Morphine in Tincture.	Percentage Morphine Lost.	Time Allowed for Maceration, Hours.	Time Consumed in Percolation, Days.
1. U. S. P., 1890	14.521	1.243	2.091	12	8
2. Granulated opium	14.521	1.433	0.191	4	1
3. Granulated opium with talcum	14.521	1.312	1.401	12	2
4. Granulated opium with pumice	14.521	1.241	2.111	12	4

The manipulation when granulated opium was used is as follows: Into the lower orifice of a cylindrical percolator place a plug of absorbent cotton, introduce the opium loosely without previous moistening, then press it down and cover it with a filter paper, held in place by a suitable weight. The desired menstruum can now be carefully poured on, and after due maceration (which may vary from four to twelve hours, according to the desire of the operator), percolation may be allowed to proceed, the rate of outflow being so regulated as to exhaust the drug in the most thorough and speedy manner.—Drug. Circ., July 1898, 154–155.

Tinctura Opii Deodorati cum Camphorâ—Improved Formula for Paregoric.—Thos. S. Wiegand proposes an improved formula for paregoric, which consists essentially in deodorizing the opium by means of ether. One drachm of opium is macerated for two days in a close vessel with one fluid ounce of ether, then transferred to a percolator and percolated with ether until the percolate passes colorless. The residual opium is extracted with water, the solution is concentrated to half ounce, and with this paregoric is then made in the proportions and with the ingredients ordered in the Pharmacopœia.—Alumni Report, May, 1899, 85.

Tincture of Strophanthus—Determination of Strophanthin by Means of the Polariscope.—See *Strophanthin* under "Organic Chemistry."

Tincture of Hops, B. P.—Question of Final Adjustment.—In the new British Pharmacopœia (1898), the quantity of hops to be used to a pint (20 fl. ozs.) of menstruum has been increased to 4 ozs., the previous Pharmacopœia (1885) directing 2½ ozs. The strength of the menstruum has also been increased somewhat (to 60 per cent.). J. Rutherford Hill had occasion to compare some preparations made by the new process with others made by the older, and was surprised to find that the older preparations compared favorably in flavor, amount of extractive, etc., with the new. Indeed, in one case, the preparation of 1898 contained less extractive and had an inferior flavor to one of the tinctures made by the 1885 process. These differences may, however, be due to inferiority in the hops used, and the difference in the menstruum, etc. The more important point made by the author is that the Pharmacopœia directs maceration in a specified quantity of the menstruum, but does not direct that the final tincture shall be brought to a definite volume. From the discussion which the paper elicited at an evening meeting of the Pharmaceutical Society in Edinburgh, there appears to be considerable difference of opinion as to the intent of the Pharmacopœia. Mr. Hill expresses the opinion that the liquid, after proper maceration, should be simply expressed from the dregs and filtered, while others believe that the final measure of the preparation is to be adjusted to 1 pint. It is difficult to reconcile the latter view, however, with the exactness arrived at in a Pharmocopœia.—Pharm. Journ., Jan. 21, 1899, 59–60.

Tincture (Extract!) of Vanilla—Distinction of the Artificial from the True Preparation.—William H. Hess gives the details of a systematic examination of the liquid preparations of vanilla whereby those from vanilla may be distinguished from those made artificially from vanillin, cumarin, &c. To provide the resinous ingredients of the vanilla bean artificially and so treat them that the delicate aroma incorporated in an alcoholic tincture shall equal that acquired from the bean is, a hopeless task. It is true that the synthesized vanillin is identical with that extracted from the bean itself, and that other constituents, as tannin, gum, and organic acids may be duplicated in an artificial preparation. But

there is one important constituent, the resin, which it will be extremely difficult to replace, and its separation and identification affords a most valuable means of proving the origin of "vanilla extract." Vanilla beans contain from four to eleven per cent. of this resin, which is of a dark red to brown color, and soluble in 50 per cent. alcohol. In cheap extracts, where as low as 20 per cent. alcohol is used, an alkali is added in order to get this resin into solution, and to deepen the color. The author gives directions for separating the resin, which may be briefly said to consist of evaporation of a portion of the "extract" to drive off the alcohol, dilution to the original volume, acidification with acetic acid—in case alkali has been used—and collection of resin on filter. After weighing an alcoholic solution of the resin is treated with ferric chloride, and also with hydrochloric acid, neither of which has any striking effect upon vanillin-resin, while most other resins give striking color reactions with these reagents. Comparative tests with a standard, by dilution, are also given, as well as tests for identifying added coloring matter.—Pharm. Review, June, 1899, 254–257.

VINA.

Medicated Wines — Pharmacopœial Necessity to Positively Define the Kind of Wine to be Used for this Preparation.—Up to the year 1895 it was the practice of the pharmacists of Germany to employ Sherry wine exclusively for the (German) pharmacopœial preparations in which the so-called "Southern wines" were directed. Since the appearance of the supplement to the Germ. Pharm. III., however, it has become the practice to employ other wines of southern origin, such as Marsala, Port and Malaga, besides wine produced from grapes grown near Xeres (Sherry wines), this change in practice being due to the definition of medicinal wine in the supplement—"any 'Southern wine' having the same character as Xeres (Sherry) wine." In a report of the Wine Commission of the Berlin Apothecary Association, Dr. M. Holtz calls attention to these changes in the practice of the German pharmacists, and points out, on the basis of a large number of determinations of the composition of these different wines, and of the official medicated wines made from them, that a positive definition of the kind of wine to be used in pharmacopœial preparations is not only desirable, but necessary, by reason of the difference in appearance, taste and composition of these preparations in accordance with the wines employed. He urges that a single wine, from a single source, and easily obtainable, of uniform quality and composition, should be adopted as the official wine to be employed in all preparations. —Apoth. Ztg., June 3 and 7, 1899, 332 and 341.

Vinum Djamboe—Formula.—Cæsar and Loretz give the following approved formula for preparing Wine of Djambo: Macerate 1 p. djambo leaves, finely cut, in 9 p. white wine and 1 p. 50 per cent. alcohol or cognac during 8 days, express and filter. The addition of 2½ per cent.

of alcohol to the filtrate secures its permanent brightness.—Pharm. Centralh., Sept. 29, 1898, 700.

Miscellaneous Preparations.

Clay Bandages—Advantages.—Dr. Langemark draws attention to the advantages of clay as a material for bandaging. It is non-poisonous, strongly drying, odorless—also to some extent deodorant—non-irritant, and acts as an efficient compress to promote the healing over of the stumps after amputation. The only drawback to its use is the liability of causing granulation of the edges of the wound : but this may be overcome by using a clay paste containing glycerin and vaseline, thus ; White clay, glycerin, āā 12.5 ; vaseline, 25.—Münch. Med. Wochenschr., 1899, 111.

Aseptic Catgut—Preparation.—Roussel explains the process of obtaining catgut and rendering it perfectly aseptic. Catgut is not, as its name would imply, obtained from the intestines of cats, but from those of the sheep. This gut, which is uniform for its entire length (20–30 meters), is formed by transverse fibres which are held together by a band, 2 to 4 Mm. wide, composed of longitudinal fibres, known as the gut-nerve, and this alone is used for the preparation of catgut, the various operations being as follows : The sheep gut is split, the band, or "nerve," is removed, and completely deprived of fat by repeated treatment with weak solution of alkali-hydrate. It is then bleached by means of hydrogen dioxide, then immersed in 2 per cent. aqueous solution of mercuric chloride during 48 hours, and then immediately wound upon a spindle, to prevent fissures or knots, one, two, or three "nerves" being spun together into catgut of the desired thickness. The catgut so obtained is wound on other spindles and dried in an atmosphere of sulphurous acid or of formaldehyde. After drying during 24 hours, the surface of the catgut is polished with pumice, the dust adhering to the surface is removed by passing the catgut between the thumb and index fingers, wound upon small glass spools, and preserved in alcohol. During the latter operation, beginning with the removal from the mercuric chloride solution, the hands and lower arms of the operators, as well as all the apparatus, utensils and appliances, must be carefully made aseptic. Obtained under the careful observance of these conditions, the catgut has proven to be completely sterilized.—Apoth. Ztg., May 27, 1899, 314 ; from Petit Monit. de la Pharm., 1899, 3205.

Catgut—Sterilization by Dry Heat.—Professor Tscherning's method of sterilizing catgut is described by Dr. J. H. Dauber as follows : Ordinary commercial catgut is placed on trays in the sterilizer, between sheets of cellulose paper, and heated for six hours, the temperature for the first hour being 60° C., for the second and third hours, 100° C., and for the fourth, fifth and sixth hours, 140° C. The catgut is then wrapped up and closely sealed in an envelope of cellulose paper, and this again in a second

envelope. The closed packet is then heated in the sterilizer for two hours, at 140° C., after which it need not be opened until its contents are required for use. The method possesses several advantages over the wet methods commonly employed. The gradual raising of the temperature prevents the catgut from becoming brittle, the grease and oil naturally present being driven off gradually at the lower temperature.—Pharm. Journ., Oct. 29, 1898, 459; from Lancet, *3921*, 1055.

Nutrient Agar—Preparation.—Dr. T. Yakote recommends the following method of preparing "nutrient agar:" 500 Gm. of chopped beef, free from fat and sinews, are placed in a flask with 1 liter of pure water; the mixture is well shaken, and heated on a sand bath, moderately at first and then to boiling. After boiling for 1½ hours the broth is filtered through a wetted filter, 15 Gm. of agar are added to 1 liter of filtrate, and the boiling is repeated on the sand bath for 1 hour; 10 Gm. of peptone and 5 Gm. sodium chloride are added, and when solution is effected, it is treated with soda solution to faint alkalinity. After cooling the solution to about 50° C., the whites of two eggs are added and the mixture is strongly and well shaken, the rapidity of the subsequent filtration depending upon the thoroughness with which this is done. The mixture is then heated strongly on the sand bath, which must have a temperature near the flask of at least 110° C.—this being also an important factor in facilitating the filtration—and the mixture is boiled during 1½ to 2 hours, the water being replaced as it evaporates. It is then filtered through a folded and moistened filter placed in an ordinary glass funnel, when, under favorable conditions, the filtration is completed within 5 minutes and without loss. —Apoth. Ztg., April 22, 1899, 212; from Centrbl. f. Bakt. u. Parask, Abt. I., xxv., 379.

Antiseptic Fumigation—Formula Recommended in Cases of Phthisis.—"Reform Med." gives the following composition for a fumigatory, to be used in the rooms of persons suffering with phthisis: Solution of formaldehyde, 40 per cent., 60; creosote, 15; oil of turpentine, 37; menthol, 1. The mixture is dropped on hot metallic plates for vaporization, about 2 grammes being enough for a room.—Apoth. Ztg., Mar. 11, 1899, 127.

Zinol—A New Antiseptic Agent.—Dr. M. Overback recommends a mixture of zinc acetate, 1 p. and alumnol, 4 p., which is introduced under the trade-name "zinol," for the treatment of gonorrhœal affections in women. He employs it in the form of luke-warm washings, 3:1000, morning and night.—Apoth. Ztg., May 27, 1899, 314; D. Med. Ztg., 1899, No. 8.

Migrænin—Practical Formula.—George Weinedel suggests the addition of a small percentage of calcined magnesia in making "migrænin," according to the published formula, in order to secure a dry product at the lowest possible temperature. If the temperature is too high, the pro-

duct is liable to become yellow; if too low, it is liable to be moist. The modified formula is as follows: Antipyrine, 85.0; caffeine, 9.0; citric acid, 6.0; *calcined magnesia*, 0.5 to 1.0—Pharm. Ztg., Mar. 8, 1899, 161.

Martol—An Extract from Cacao-Shells.—F. Stroschein has introduced a thick liquid extract of cacao-shells, which, he claims, contains a considerable amount of iron in natural combination, under the name of "Martol." These iron compounds, in form of tannates, amount to 0.683 per cent., and other mineral substances to 10.457 per cent. Besides these, which include phosphoric acid, the product contains theobromine and carbohydrates as important constituents.—Pharm. Post, 1898, 618.

Naphthol Camphor—Formula.—The following formula for naphthol camphor is given in "Bull. Soc. Pharm. de Sud-ouest" (XX, 133): Warm 1 part of naphthol, in fine powder, with 2 parts of camphor until melted; filter, and preserve the liquid in well-covered yellow glass bottles.—Pharm. Journ., Sept. 3, 1898, 279.

Phenosalyl—Formula.—According to Sibut, phenosalyl is composed of phenol, 80; salicylic acid, 10; lactic acid, 20; menthol, 1. The phenol and acids are mixed, heated until melted, and the menthol is then added. —Pharm. Journ., Sept. 3, 1898, 279; from Bull. Soc. de Pharm. de Brux.

"Celery Compound"—Formula.—A. E. Hiss recommends the following formula for a "celery compound": celery seed, ground, 8 ozs. av.; red cinchona, ground, senna, cut, āā, 4 ozs. av.; coca leaves, whole, sweet orange peel, cut, Rochelle salt, āā, 2 ozs.; iron phosphate, soluble, 1 oz. av.; simple syrup, sweet spirit of nitre, āā, 8 fl. ozs.; alcohol, 24 fl. ozs.; water, q. s. ad 1 gallon. Heat five pints of water to boiling, add the celery seed. cinchona, coca and orange peel, and keep quite warm on the stove for five minutes, strain with expression, and pass enough warm water through the strainer to make five pints of liquid. To this add the senna, digest at a temperature not to exceed 65° C. for one hour, strain, and again add warm water through the strainer to make five pints of liquid. Dissolve the iron salts in four fluidounces of warm water, add to the strained liquid, also add the salt, agitate occasionally until the latter is dissolved. When cool add the alcohol, spirit, syrup, and enough water to make one gallon. This preparation possesses tonic, laxative, and diuretic properties. The adult dose is one or two teaspoonfuls three times a day. —Bull. Pharm., Aug., 1898, 344.

Tasteless Chill Tonic—Formula.—Frank Edel recommends the following formula for making a so-called syrup of tasteless quinine, or tasteless chill tonic: Quinidine (alkaloid), gr. 256; sodium bicarbonate, gr. 20; reduced iron, gr. 128; saccharin, gr. 20; essence of orange, 2 drachms; syrup, enough to make 16 fl. ozs. Rub the sodium bicarbonate and saccharin with a portion of the syrup, and the quinidine and reduced

iron with the remainder. Mix the two fluids, add the essence of orange, and shake thoroughly.—West. Drug., Dec., 1898, 546.

Blood Purifier—Formula. — A. E. Hiss recommends the following formula for a blood purifier: Sarsaparilla, cut, 4 ozs. av.; buckthorn, sodium sulphate, āā 8 ozs. av.; sodium sulphite, 2 ozs. av.; iron thiosulphate, 1½ ozs. av.; "essence of sarsaparilla," 4 fl. ozs.; alcohol, 16 fl. ozs.; water, q. s. ad 1 gallon. Heat the sarsaparilla and buckthorn with 1 gallon of water to slow boiling for fifteen minutes; strain, and pass enough hot or boiling water through the dregs to make 6 pints of colature. In this dissolve sodium salts with the aid of heat, add the iron salt previously dissolved in 4 fl. ozs. of warm water, allow the mixture to cool, add the alcohol and "essence of sarsaparilla," and enough water to make 1 gallon. The

"*Essence of Sarsaparilla*" is made by dissolving 2 drachms each of the oils of sassafras and wintergreen in enough alcohol to make 4 fl. ozs.—Bull. Pharm., Aug., 1898, 343.

Tasteless Castor Oil—Formula and Process.—John A. Foote recommends the following formula and process for preparing a "tasteless" castor oil:

Pure castor oil	1 pt.
Cologne spirit	3 fl. ozs.
Oil of wintergreen	40 mins.
Oil of sassafras	20 mins.
Oil of anise	15 mins.
Saccharin	5 grs.
Hot water—a sufficient quantity.	

Place the castor oil in a gallon bottle. Add a pint of hot water and shake vigorously for about fifteen minutes. Then pour the mixture into a vessel with a stop-cock in its base, and allow the mixture to stand for twelve hours. Draw off the oil, excepting the last portion, which must be rejected. Dissolve the oils and saccharin in the cologne spirit and add to the washed castor oil.—Amer. Drugg., Jan. 25, 1899, 37.

Cathartic Tea—Formula.—A. E. Hiss recommends the following formula for a cathartic tea: Senna, cut, 16 ozs. av.; couch grass, cut, 10 ozs. av.; elder flowers, 4 ozs. av.; coriander, fennel, āā 3 ozs. av.; anise, 4 ozs. av. The seeds are to be bruised. One or two teaspoonfuls of this mixture is poured in a teacupful of boiling water for a few minutes, and then strained, constitutes a laxative dose. It should be taken while the liquid is quite warm.—Bull. Pharm., Aug., 1898, 343.

Tape Worm Remedy—Formula.—"Bull. gèn. de Therap." publishes the following formula for a tape worm remedy: Acid salicylic, 0.40; ol. filic. mar. æther., 0.60; ol. cinnamomi, gtt. 10; gum arabic, 8.0; aq. dest., 96.0; syr. simpl., 50.0. To be taken fasting in the morning, in two doses.

Vermifuge—Formula.—A. E. Hiss recommends the following formula for a liquid vermifuge: Fld. ext. pink root and senna, simple syrup, āā 16 fld. ozs.; extract of licorice, pure, 2 ozs. av.; water, 2 fl. ozs. Soften the extract with the water and add the other ingredients. A teaspoonful may be given to a child six years old every six hours until the bowels move freely.—Bull. Pharm., Aug., 1898, 344.

Tooth Ache Drops—An Efficient Preparation.—Frank Edel recommends the following formula for preparing very efficient toothache drops: Menthol, 4 drachms; caloroform, 2 fl. ozs.; fluid extract Jamaica dogwood, enough to make 16 fl. ozs.—West. Drug., Dec., 1898, 547.

Earache Drops—Formula.—The following formula for earache drops is recommended by A. E. Hiss:

Cocaine hydrochloride	5 grains.
Chloral hydrate	60 grains.
Camphor	60 grains.
Chloroform	3 fluidrachms.
Castor oil	sufficient to make 1 fluidounce.

—Bull. Pharm., August, 1898, 345.

Eau de Quinine Hair Tonic—Formula.—"Sam Bucus" recommends the following formula under the name of "Eau de Quinine Hair Tonic": Quinine sulphate, 4 drachms; Jamaica rum, 12 ozs.; alcohol, 20 ozs.; water, ½ pint; glycerin, 3 ozs.; tinct. of cantharides, 1½ ozs.; extract of rose, 3 ozs. Mix and filter.—Bull. Pharm., June, 1899, 13.

Sealing Wax—Useful Formula.—According to "Neueste Erfind. u Erfahr." (1899, 228), the following formula yields sealing wax which is particularly adapted to sealing flasks containing alcoholic liquids, since the product is insoluble in alcohol: Mix together 5 p. yellow wax, 1 p. carnauba wax, and 1 p. paraffin, and gradually stir into the melted mixture 5 p. red lead, and 2 p. levigated chalk. The application of this wax is effected by dipping the necks of the bottles into the melted mass to a depth just sufficient for the protection of the cork.—Pharm. Centralh., April 20, 1899, 245.

Silvering Mirrors—Practical Process.—Frank Edel recommends the following practical process for silvering mirrors, which he has found to work nicely and at the same time economically. Two solutions are required, which are conveniently designated as Solutions No. 1 and No. 2.

Solution No. 1 is made from 1 oz. av. silver nitrate, 8 fl. ozs. distilled water and a sufficiency of ammonia water. Dissolve the silver in the water and add ammonia water gradually until the brown precipitate that is thrown down at first is just dissolved, being extremely careful not to add too much ammonia. But for fear that too much ammonia has been added, drop into the solution a crystal of nitrate of silver and shake; if this makes the solution turbid, it is all right; if not, and it clears up, add

more silver until it remains turbid. Then filter through a double paper filter, turning back until clear, and add distilled water through the filter till the filtrate measures 16 fluid ounces. Place this in a clean bottle, cork and keep in a cool, dark place over night.

Solution No. 2 is made as follows: Dissolve ¼ oz. av. of sodium and potassium tartrate in 10 fl. ozs. of water, place in a porcelain-lined dish and heat to boiling; then add 10 grains of nitrate of silver and stir thoroughly with a clean glass rod; then boil gently for ten or fifteen minutes, or until the solution becomes a gray color. Filter this through a paper filter and turn back until it comes through clear; then add enough distilled water through the filter to make the filtrate measure 16 fluid ounces. Put in a clean bottle and cork, then place in a cool, dark place for five or six hours.

When wanted for use, mix one fluid ounce of each of the solutions together, add four fluid ounces of distilled water, and immediately pour this mixture over the glass, which has been previously cleaned and leveled on some firm support. Then allow to stand until the solution has deposited its silver, about one hour being long enough. Then dip off, rinse by sprinkling, and stand on edge to dry. Lastly, protect with a coat of asphalt varnish.—West. Drug., July, 1898, 295.

New Remedies.

A list of new remedies, with brief mention of their composition, properties and uses, that have been noticed in the medical and pharmaceutical journals during the period covered by this report, as collected and arranged by Prof. Dr. H. Beckurts in Apotheker Zeitung, Aug. 13 and Nov. 23, 1898, and Feb. 15 and May 3, 1899.

p-Acetamidophenoxylacetamid.—Needle-shaped, bitter crystals, soluble in water. Use: as an antiseptic.

p-Acetamidophenoxylacetamidchloral.—Addition product of acetamidophenoxylacetamid and chloral, obtained by triturating these components together. A substance having a faint odor of chloral, and sparingly soluble in water. Use: as sedative and hypnotic.

Acetphenetidinsulphonate of soda.—Occurs in form of fine crystalline reddish-white mass, quite hygroscopic, and freely soluble in water, sparingly soluble in alcohol, insoluble in ether. Proposed as a substitute for phenacetin.

Acideolith.—A disinfectant containing sulphur, but otherwise of unknown composition.

Acoin: = Dipara-anisylmonophenetylguanidinchlorhydrate. A local anaesthetic, proposed as a substitute for cocaine.

Airoform-Airol.—Bismuth oxyiodide-gallate.

Alginoids.—Compound of alginic acid with the metallic bases, characterized by remaining intact in the stomach, but becoming active by splitting up in the intestines.

Alginoid-Alkaloids.—Compounds of alkaloids with alginic acid. Soluble in water, not in the stomach, but split up in the intestines.

Alginoid-Antimony.—Compound of antimony and alginic acid. A white powder containing 4.5 per cent. of antimony, insoluble in the stomach, but decomposing in the intestines.

Alginoid-Arsenic.—Compound of arsenic and alginic acid. A white powder, soluble in ammonia, and in the form of solution not decomposed until it reaches the intestines.

Alginoid-Magnesia.—Compound of magnesia (4.2 per cent.) and alginic acid, becoming active when it reaches the intestines.

Amylene Chloral—Dimethylethylcarbinolchloral.—A colorless, oily fluid, having a camphoraceous odor, a burning taste, and a specific gravity of 1.24. It is insoluble in water, and is used as a hypnotic.

Antimorphine.—A solution of disodium phosphate.

Antipyrinum Tannicum.—Prepared by mixing solutions of 3.2 Gm. antipyrine and 1.88 Gm. tannin, each in 10 Cc. of water. A tasteless, yellowish, insoluble powder, which is split up into its components on addition of acids.

Antiscabin.—A preparation composed of balsam of Peru, soap, glycerin, alcohol, boric acid and β-naphthol., forming a saponaceous, brown fluid. Use in the treatment of scabies.

Argonin-L.—Soluble argonin, which is said to be very easily soluble in cold water, and to form solutions which keep well for months. It contains 10 per cent. of silver.

Aromatin.—A white, aromatic fluid containing ferric pyrophosphate; or an effervescent powder containing sodium pyrophosphate.

Asterol — Paraphenolsulphonic Mercury — Ammonium Tartrate. — A brown powder soluble in hot water, having a faint odor, and used as an antiseptic wound dressing in place of corrosive sublimate and carbolic acid.

Bacillol.—A black-brown, clear, thick fluid, having a cresol-like odor and an alkaline reaction. It is miscible in water and is recommended as a disinfectant.

Balatin.—A South American latex, which is used to form an impervious coating by penciling on the skin.

Blepharis capensis.—A South African *Acanthacea*, used according to Blaine in the form of tincture, in doses of 16 drops every three hours during several days, as a specific for carbuncles.

Borotartrol.—Composed of boric acid and neutral sodium tartrate.

Borsyl.—A dusting powder, used against sweating, composed of boric acid, alkali or alkaline earthy borate and cetyl alcohol (spermaceti [?] Rep.).

Bromacetone.—See penta- and tetra-bromacetone.

o-Brommethyl-Bromchinolin.—Crystals melting at 110°.

o-Brommethylchinolin.—Colorless crystals melting at 35°.

Bromoform Rum.—Bromoform, 1.2; chloroform, 0.8; rum, sufficient to make 120.0. A safe remedy for the treatment of whooping cough.

Bromoxazolid.—Obtained by heating o-acetyl-p-bromphenol with phenylhydrazine in glacial acetic acid. Yellow crystalline scales, melting at 167°.

Bynol.—An extract of malt with cod liver oil.

Cæruleum toluidinicum.—The chloride of zinc double salt of dimethyltoluthionin. A black powder, soluble in water and alcohol with a blue color, and used, like methyl-blue, in the treatment of infectious and suppurating inflammations of the skin.

Casanthrol.—According to Unna this is a mixture of Ungt. Caseini with 10 per cent. of Ext. Lithantracis. The latter is the portion of coal-tar that is soluble in ether and benzol. The remedy constitutes a thick, tenacious emulsion, which dries upon the skin, forming an elastic coating. It may be combined with any other desirable remedial agent that does not coagulate casein. Used in eczema, prurigo, etc.

Casein Glycerophosphate.—A solution of a salt of glycerophosphoric is heated at 30–40° with casein; the resultant solution is filtered after standing twelve hours and evaporated *in vacuo* at 40 to 50°.

Cearin.—An unctuous mass composed of 1 part of carnauba wax and 4 parts of liquid paraffin. A white, permanent base for ointments, capable of taking up from 15 to 18 per cent. of water.

Chininsulfocreosotate.—Shining yellow scales, readily soluble in water, insoluble in alcohol, having a bitter, smoky taste, and used as an antiseptic.

Chinin-Urethan.—A mixture of 2 parts of quinine hydrochloride and 1 part of urethane.

Chinolin bismuth rhodanate $(C_9H_7N.HSCN)_2.Bi(SCN)_3$.—A red-yellow powder, melting at 76°, insoluble in water, and used in the treatment of boils, ulcers, etc.

Chloralbacid.—A chlorinated substitution compound of albumin, obtainable by several methods. The sodium compound is a powder, free from fatty acids and soluble in water, and is given in dose of 1 to 2 Gm. in cases of atonic indigestion.

Chloral-Tannin.—A condensation product of chloral hydrate and tannin obtained by heating them together. A gray-brown powder, sparingly soluble in water, soluble in alcohol. Used in skin diseases.

Chloroxazolid. — Obtained by heating o-acetyl-p-chlorphenol and phenylhydrazine in glacial acetic acid. Yellow crystals, melting at 172°.

Chrysarobin hexa-acetate.—A yellow powder.

Collargolum.—Colloidal silver.

Colloidal Gold.—Obtained by Zsigmondi by reducing diluted faintly alkaline solutions of gold with solution of formaldehyde and dialyzing the product.

Colloidal Mercury.—Formed by mixing dilute solutions of mercurous nitrate and stannous nitrate and adding ammonium nitrate to the brown fluid produced. Silvery glistening pieces, soluble in water with a deep brown color.

Collodium Iodolisatum.—A solution of 1 p. iodol in 9 p. collodion. Used in erysipelas and similar affections.

Cornesin.—Said to be composed of cod-liver oil.

Crystallin.—A solution of collodium cotton, 1 p. in methyl alcohol, 4 p., and amyl acetate, 15 p. A substitute for collodium.

Davosin.—Chocolate containing guaiacol carbonate.

Diacetphenetidid=Acetylated phenacetin.—Colorless crystals, which give off acetic acid when exposed to the air. Used like phenacetin.

Dialysata Composita.—A new class of preparations, prepared by a German firm after the manner of making "dialyzed fluid extracts," from mixtures of drugs, such as species amarum, species pectoralis, &c.

Diamidophenylendiamine.—Use: as hair dye.

Diethylketone.—A colorless liquid, boiling at 101°, used as a sedative in hysteria, &c., and as hypnotic.

Dimethylethylcarbinolchloral.—Obtained by the action of amylene hydrate (dimethylethylcarbinol) on chloral. An oily, colorless fluid, insoluble in water, miscible with alcohol, ether, acetone, chloroform and fixed oils, having an odor resembling camphor and a cooling taste.

Dionin.—The hydrochloride of the monoethylester of morphine. A white crystalline powder, odorless, bitter, melting at 123°; soluble in water, insoluble in ether and chloroform. Used as a substitute for codeine in phthisis, bronchitis, asthma, pneumonia, etc.

Elastin.—An antiseptic liquid forming an elastic membrane when applied to wounds.

Emol.—An efficient emulsifying agent, occurring in form of a flesh-colored powder. It acts upon the skin as a detergent, similar to soap, and has the property of rendering hard water soft.

Erythol.—A double compound of bismuth and cinchonidine iodide. Used in dyspepsia.

Ethylol.—Chemically pure ethyl chloride.

Eudermol—Salicylate of Nicotine. — Anhydrous needles, melting at 117.5°. Used as salve with vaseline in skin diseases.

Eugallol.—Pyrogallolmonacetate, supplied in the form of a brown-yellow syrupy liquid, containing 33 per cent. of acetone, and readily soluble in water. It is used externally in psoriasis.

Eugenoform—Eugenolcarbinol sodium. — Obtained by the action of formaldehyde on eugenol. The sodium compound forms broad, colorless crystals, readily soluble in water, with difficulty in alcohol, and melting at 160° C. It is given internally in doses of 0.5 to 1.0 Gm.

Eulactol.—A yellowish white powder, recommended as a nutrient and milk substitute. It is said to be composed of water, 6.39 per cent.; albuminoids, 28.46 per cent.; fat, 14.28 per cent.; carbohydrates (milk sugar), 46.35 per cent.; phosphoric acid, 0.573 per cent., lime, 0.316 per cent.; ferric oxide, 0.062 per cent.; total inorganic substances, 4.27 per cent.

Eunol (*α*- and *β*-Eunol).—Compounds of the corresponding naphthol with eucalyptol. Bitter substances, insoluble in water, soluble in alcohol, ether, etc., and used dermatologically and in the treatment of wounds.

Euphthalminum salicylicum. — Prepared by dissolving salicyclic acid and euphthalmin in equivalent proportions in absolute ether, crystallizing and recrystallizing from absolute ether-alcohol. The crystals melt at 115–116° and are soluble in water.

Euresol.—Resorcinmonoacetate, a pleasantly odorous, thick, transparent mass. Its solution in acetone is used in diseases of the scalp.

Eurobin.—This is chrysarobin triacetate, and is recommended as a substitute for chrysarobin on account of its non-toxity and non-irritant effect upon the skin.

Ferripton.—A clear, neutral, deep-brown liquid, without special odor or taste, of specific gravity 1.06 at 15° C., recommended in anæmia and chlorosis, and said to be composed of 3.8 iron, 7.0 proteids and 89.2 per cent. of water.

Fervin.—A ferruginous extract of meat, dispensed in capsules, and used as roborans.

Fluor-Bromide of Ammonium.—Used for inhalations in the treatment of infectious diseases of the nose, throat and larynx.

Fluor-Chloride of Ammonium.—Used for inhalations in the treatment of tuberculosis, diabetes and gout.

Formaldehyde-Tannalbuminate.—Obtained by the direct action of formaldehyde on tannalbumin. Not soluble in the stomach, but decomposed in the intestines. Use: as an antiseptic and astringent.

Formaldehyde-Urea.—A condensation-product obtained from urea and formaldehyde in alkaline solution. An amorphous white powder, insoluble in water. Use: as disinfectant.

Formoferin.—A foot-powder composed of formaldehyde, 0.13; thymol, 0.1; zinc oxide, 34.5; starch, 65.2.

Galactophenetidid.—A condensation product of p-phenetidin and galactose, forming columnar crystals, which melt at 165°.

Galloformin.—$C_6H_2(OH)_3COOH(CH_2)_6N_4$. A condensation product of gallic acid and hexamethylenetetramine. Crystalline needles, with difficulty soluble in water, alcohol and ether. Used internally and externally as a remedy which easily splits up to form formaldehyde.

Geoform.—A condensation product of guaiacol and formaldehyde. Odorless, tasteless, non-irritant, non-corrosive, easily soluble in water, and readily split up into its original components.

Glacialin.—A conservative for meat, composed of borax, 1 part; boric acid, 3 parts.

Globon.—This is an albuminoid nutrient.

Glucophenetidid.—A condensation product of glucose and p-phenetidin. Snow white, shining needles, melting at 160°, with difficulty soluble in cold water, easily soluble in boiling water. A reducing agent for silver salts.

Glycosolool.—A product obtained by the action of oxypropionic acid upon peptone and simultaneously of sodium theobromate upon the zymogen of trypsin. A remedy for diabetes.

Gomenol.—The volatile oil of *Melaleuca viridiflora*. Used in diseases of the respiratory organs, in rheumatism and disorders of the bladder.

Gonorol.—This is purified sandal-wood oil.

Guacamphol.—The camphoric acid ester of guaiacol. White needles, ordorless, tasteless, insoluble in water, readily soluble in alcohol. Used in night-sweats and diarrhœa.

Guaiacolsulphonates of the Alkaloids.—Odorless, non-irritant compounds prepared by combining the desired alkaloid with guaiacolsulphonic acid. Particularly useful in combining an alkaloidal antipyretic with the antiseptic acid.

Guajacyl.—The calcium salt of guaiacolsulphonic acid. A blue-gray powder, soluble in alcohol and water. Used as a local anaesthetic.

Guaiaperol.—This is guaiacolate of piperazine. It forms needle-shaped crystals, which melt at 79.8° and are soluble in water.

Hæmanutrid.—A preparation containing 70 p. hæmoglobin, 20 p. glycerin and 10 p. brandy (cognac).

Heroin.—The diacetic ester of morphine. Used in cough, pain in the chest, catarrhal inflammations, etc.

Hetol.—Sodium cinnamate.

Hydragogin.—A diuretic.

Hyrgol.—Colloidal mercury, which see.

Ichthalbin.—Obtained by adding a solution of ammonium ichthyol sulphonate to a solution of albumen, and then diluted sulphuric acid. The product is deprived of the odorous volatile oil, either by heating or by treatment with alcohol, benzol or ether. It is odorless and tasteless.

Ichthyol Compounds are obtained by combining ichthyol with alkaline earths or metallic oxides, and heating the compounds to 130°–140°C., or treating them with alcohol, methyl alcohol, or ether.

Imidohydrine.—Obtained by the action of water upon imidoether.

Iodoform-Iodethyl-Diethylsulphidmethane— Crystalline leaflets which melt at 125°, and combine the activity of sulphur and iodoform.

Iodoform-Triethylsulphonium iodide.—Prepared by combining iodoform and triethylsulphonium iodide. Forms crystals resembling iodoform and melting at 142°. Combines the activity of sulphur and iodoform.

Iodogallicin.—A compound of bismuth, gallic acid and iodine, containing 38 per cent. Bi and 23.6 per cent. I. A light, amorphous, insoluble, dark-gray powder, possessing bacteriological properties equivalent to those of aïrol.

Iodothymoform (see "Thymoform.")—A yellow, nearly odorless powder, melting at above 150°, insoluble in water, soluble in alcohol and ether. Particularly useful for bandages, splitting up readily into its components —iodine, thymol and formaldehyde.

Iron Albuminate.—Compounds of egg albumen with the ferric compounds of salts of nitrosonaphtholsulphonic acid, obtained by mixing the components. They are odorless, tasteless compounds, with difficulty soluble in water, and not absorbed when administered until they reach the intestines.

Isutan = Bismutan.

Kakaophen.—A nutrient preparation, composed of dextrinated rice flour, leguminous flour and cacao.

Kelenmethyl.—A mixture of chlorethyl and chlormethyl.

Kil.—A Russian dermatological remedy.

Kreoform.—A condensation product of creosote and formaldehyde. Odorless, tasteless, non-corrosive, non-toxic compound, insoluble in water, readily soluble in alcohol and ether. Use depends upon ease with which it is split up into its components.

Kreosoform.—A disinfectant composed of creosote and formaldehyde.

Kreosot-formalin.—A mixture of 150 creosote, 600 formalin, 10 menthol and 375 oil of turpentine. Used as vapor for disinfecting sick rooms.

Kresamin.—A mixture of cresol and ethylamine. A colorless liquid, having a phenol-like odor and alkaline reaction. Used as an antiseptic.

Lenigallol = Pyrogalloltriacetate. A white powder, insoluble in water, used in eczema, psoriasis, etc.

Lenisobin = Chrysarobintetracetate. A substitute for chrysarobin in milder chronic skin affections.

Linanthral (*Ext. Olei Lithanthracis*).—An extract of coal-tar prepared by the aid of volatile solvents. Used as addition to ointments.

Martol.—A preparation from cacao-shells, containing iron.

Menthol-Iodol.—Iodol containing 1 per cent. of menthol.

Methenyl-di-p-phenetidin and -anisidin.—Prepared from p-phenetidin and ortho-formic acid ester. A crystalline compound, which melts at 114°, and acts as a local anaesthetic. Used in seasickness.

Methylphenmorpholin.—Obtained by reduction of o-nitrophenacetin. A colorless, oily fluid, boiling at 150–152°. Used as narcotic.

Metakresol-Anytol.—A liquid containing 40 per cent. of metacresol and 60 per cent. of "anytin." "Anytin" is an aqueous solution containing 33.3 per cent. of alcoholic ichthyol extract. Used as an application in erysipelas.

Mydrin.—A mixture of ephedrine hydrochloride and homatropine hydrochloride. Used as a mydriatic in form of 10 per cent. solution.

Naphthoformin.—A condensation-product of α- or β-naphthol with formaldehyde and ammonia. Insoluble, powerful antiseptic, being easily split up into its components.

Nirvanin.—The hydrochloride of diethylglycocoll-p-amido-o-oxybenzoicacidmethylester, forming white crystals, soluble in water, neutral in reaction, and recommended as a non-toxic local anæsthetic.

Opianic Acid—Dimethylethylcarbinolester.—Obtained by boiling the components together and pouring the product of reaction into dilute soda solution. Colorless crystals, insoluble in water. Used as hypnotic.

Orthoform "New"—m-Amido-p-oxybenzoicacidmethylester.—A fine white powder, not so liable to ball together as the orthoform first introduced.

Oxaphor—An alcoholic solution of oxy-camphor, containing 50 per cent. of the medicament, and recommended in doses of 0.5 to 1.0 Gm. in emphysis, bronchitis, and pulmonary consumption.

Paraffinxylol.—A solution of 1 Gm. of paraffin in 10 Cc. of xylol. Used as aseptic coating of the hands during surgical operations.

Paraphenetidin Furfurol.—Obtained by heating the components together. Tabular crystals, insoluble in water. Used as an antiseptic and analgesic.

Pentabromacetone.—Obtained by the action of bromine on acetondicarbonic acid. Colorless crystals, melting at 76°.

Petrosulfol.—A preparation of ichthyol.

Petrovarine.—A viscous petrolatum (vaselin), free from acids and resin.

Phenalgin.—Ammonium phenylacetamide. A fine white powder, having a pungent odor, but no pronounced taste. Recommended in neuralgia and rheumatism, and as a hypnotic.

Phenosal.—Acetosalicylate of phenetidin. Colorless, acidulous crystals, sparingly soluble in water, easily split into its components when taken into the stomach, and recommended as a febrifuge.

Phenosalyl.—A mixture obtained by melting 8.0 carbolic acid, 1.0 salicylic acid, 2.0 lactic acid, and 0.1 menthol together.

Phosphot.—A creosote compound obtained by the reaction of one molecule of oxychloride of phosphorus and three molecules of creosote in the presence of an alkali, washing the product with dilute soda and water, and drying.

Polyforminum Insolubile.—Compounds of polyvalent phenols, or phenols with condensed benzol nucleus, with formaldehyde and ammonia. Insoluble, strongly antiseptic compounds, the type of which is the resorcin compound known as "polyformin," and recommended as possible substitute for iodoform.

Polyforminum Solubile — Di-Resorcin. — Hexamethylenetetramine. White crystals, easily soluble in water and alcohol. Easily split into its components.

Prasoid.—A solution of globularin and globularetin. Used in gout and rheumatism.

Protalbin Silver.—A silver albuminoid, constituting a whitish-gray powder, soluble in warm water, and used as a mild silver preparation in the form of solution containing from 0.25 to 1.5 per cent. of the compound.

Pulvis Cuticolor.—A dermatological powder proposed by Unna, composed of: Zinc oxide, 2; magnes. carbon., 3; white bole, 3; red bole, 2; rice starch, 10 parts.

Pural.—Prepared cylinder of powdered charcoal impregnated with carbolic acid, menthol and benzoic acid. Used as antiseptic in sick rooms by igniting one or more of the cylinders, which undergoes slow combustion.

Pyrantin = p-ethyloxyphenylsuccinimide. Shining prisms, melting at 155°, sparingly soluble in water, and used as an antipyretic. Its sodium salt is readily soluble in water and possesses a sweetish taste.

Pyrazolinum Compositum.—A mixture of citric acid, 0.01; caffeine, 0.09, and antipyrine, 0.9, prepared by melting the ingredients together. A substitute for "migraënin."

Pyrogalloldiacetate.—A white powder, sparingly soluble in cold water.

Pyrogallolmonosalicylate.—A powder, sparingly soluble in water, easily split up into its components.

Pyrosal.—Aceto-salicylate of antipyrine. Colorless crystals, having a sour taste, with difficulty soluble in water, and easily splitting up into its components when taken into the stomach.

Saccharin-Natrium.—A soluble compound containing 90 per cent. of pure saccharin. Recommended as an intestinal antiseptic in doses of 1 Gm. once or twice daily, in capsules.

Saligallol.—Pyrogallol disalicylate. A resinous solid, useful mainly in the form of ointment, etc. Its solution in chloroform when applied to the skin forms a strongly adherent coating. It is prescribed in acetone solution, with eugallol (which see p. 484), for pencilings in certain skin diseases.

Salosantal.—A mixture of salol and East Indian santalwood oil. Used in diseases of the urinary organs.

Sanguino Tablets.—Tablets prepared from haemanutrid (which see p. 485).

Sanolith.—A preparation of formaldehyde, supplied in tin containers, and developing formaldehyde on opening.

Sapolentum Hydrargyri.—Superfatted potassium soap with mercury. A soft soap used for inunctions in skin diseases.

Serum, Medicated.—The normal defibrinated blood-serum of animals containing a suitable medicinal agent, and used in the form of enemata. Such, for instance, as

Sero-arsenic, a solution of sodium arsenite in normal serum, and

Sero-guaiacol, a solution of guaiacol phosphite in normal serum. Both of these are recommended in tuberculosis.

Sirolin.—A preparation of beech-tar containing much guaiacol, and having a good taste. Recommended in diseases of the respiratory organs.

Sugarine.—Methylbenzolsulphinide, obtained by saponifying toluolcyanosulphamide with potassium hydroxide, treating the product with sulphuric acid, and recrystallizing the product from dimethyl-benzol. White crystals possessing five hundred times the sweetening power of cane sugar.

Tannalborin.—A compound of aluminum with tetraboric and tannic acids.

Tannocasum.—Prepared by dissolving purified casein in solution of sodium carbonate, adding to a solution of tannin and formaldehyde, and precipitating by the addition of diluted hydrochloric acid. The precipitate is then washed, dried and pulverized. Insoluble in the stomach, but decomposes when it reaches the intestines.

Tanocol.—A tannate of gelatin prepared by precipitation, washing, pressing and drying the precipitate, heating to 150° and powdering. A

faint yellow, tasteless and odorless powder, used in chronic enterides, in doses of 0.5 Gm. to children, 1.0 Gm. to adults.

Tannepyrine.—Small cubes prepared from antipyrine and tannic acid.

Taphosot.—A compound of tannin, phosphoric acid and creosote, recommended in tuberculosis accompanied by diarrhœic complications.

Tetrabromacetone.—Obtained by the action of bromine upon acetondicarbonic acid. A yellow oil, which is easily decomposed by heating.

Tfol.—This is Arabian soapstone.

Theatrin.—An ointment composed of wax, oil and water. Recommended as a basis for ointments, keeps well, and will take up more water.

Thiochinanthren.—An anthracene-like sulphur compound of chinoline, obtained by heating chinoline and sulphur together on an oil-bath. It forms needle-shaped crystals, which melt at 305°.

Thiocol.—The potassium salt of guaiacolsulphuric acid. A fine, white, odorless powder, soluble in water, having at first a bitter, afterwards a sweet taste. Used as a substitute for creosote and guaiacol.

Thymobromal.—A mixture of bromalhydrate, extract of chestnut, and extract of thyme—the latter prepared without heat.

Thymoform.—A condensation product of thymol and formaldehyde. Yellow, tasteless, odor of thymol, insoluble in water, easily split up to produce formaldehyde, and prepared as a substitute for iodoform and dermatol.

Thymoliodide—$C_{20}H_{24}O_{21}I_2$.—Obtained by mixing solution of sodium chloride with a solution of thymol, potassium iodide, and sodium hydrate. Contains 25 per cent. of iodine, and is used externally as an antiseptic.

Tribenzoylgallic Acid.—Obtained by adding benzoyl chloride to a solution of gallic acid and potassium hydrate. White, odorless and tasteless crystals, insoluble in water, not changed in the stomach, but decomposed and absorbed in the intestines.

Tribromsalol.—Obtained by melting dibromsalicylic acid and p-bromphenol together. Melts at 195°.

Trional Water.—A solution of 1 part trional in 330 parts seltzer water. Used as hypnotic.

Tropon.—A dietetic, resembling flour in appearance, nearly odorless and tasteless, and containing from 83–97 per cent of albumen.

Triphenetolguanidinechlorhydrate.—An anæsthetic recommended in ophthalmic practice.

Uropherinsalicylate.—Theobromine lithium—lithium salicylate. Recommended as a diuretic.

Urosin.—Tablets containing 0.5 Gm. kinic acid, 0.15 Gm. citrate of lithium, and 0.3 Gm. sugar. Recommended in gout.

Valerydin.—Valerylpara amidophenetol. An odorless, tasteless, white, shining crystalline compound, easily soluble in alcohol and chloroform, nearly insoluble in water. Used in neuralgia, headache, migraine, influenza, etc., in doses of 0.5 to 1.0 Gm.

Vanillin Paraphenetidin.—Obtained by heating vanillin and p-phenetidin together. Forms yellow crystals, which melt at 102°, have the odor of vanilla, and are easily soluble in alcohol, benzol, etc. Used as antiseptic and styptic.

Vanillin Paraphenetedin Sulphate.—Crystals which melt at 148–149°, and have the same general properties as the foregoing.

MATERIA MEDICA.

A. Vegetable Drugs.

GENERAL SUBJECTS.

Botanical Garden and Arboretum of the University of Michigan.—Dr. J. O. Schlotterbeck gives some interesting information concerning his endeavors to establish a botanical garden and an arboretum on the grounds of the University of Michigan, which, though ample for this purpose, have heretofore been devoted to more utilitarian purposes, and facilities for the study of growing plants have been very meagre, if not entirely absent. The campus grounds cover an area of forty acres, and this ground is well studded with majestic trees of the forest; but unfortunately for the student, the varieties of these trees are few in number. Even at this late day no attempt has been made to improve this state of affairs, and dying trees are constantly replaced with others of the same kind. As a consequence, elms, maples and oaks predominate. The first attempt to establish a botanical garden at the University was made principally upon paper, for on one of the earliest maps of the village of Ann Arbor the greater part of the eastern half of the campus was designated as the botanic garden. Dr. Schlotterbeck, believing that it would be a long time before the University or the legislature would appropriate sufficient funds to establish at once a well-equipped conservatory and botanical garden on the campus, decided that the proper thing to do was to make a beginning in a small way, just as had been done in the several departments of the University that have now grown up to importance. His plan was to bring in from the woods and acquire by purchase as many medicinal and economic plants as would flourish in this latitude and in the conditions which could be provided on the campus. It may be surprising to most people that the State of Michigan contains more native plants than

any other State in the Union, and more even than any other country in the world, except Japan. This is a broad statement to make, but it is stated upon good authority. Michigan has more than 2,000 varieties of native plants and more than 200 varieties of trees and shrubs. Though only beginning the third year of its existence, the garden contains representatives of fully sixty different families. From the first beginning the Regents of the University have given the project their hearty sympathy and support; but whatever the eventual result may be, the Department of Pharmacy must receive the larger share of credit for having taken the initiative in the matter. In the establishment of an arboretum on the University campus the Pharmacy Department has again taken the initiative, and the undertaking will be followed with great interest by all teaching institutions of pharmacy. The importance of the move can hardly be estimated, in fact it has been repeatedly stated about the campus that no class of the Pharmacy Department has ever left a memorial of any kind which would be of more value to the school and to students than the step which the class of '99 is taking. The plan was hardly unfolded to the class, when it was enthusiastically endorsed and unanimously agreed to. Each member of the senior class selected and paid for a tree that would be of interest from a medicinal or economic point of view, and planted it in a suitable place upon the campus. Thirty trees are enumerated as the result, no two alike, and it is easy to imagine the eventual result if this practice is continued from year to year.

Principal Poisonous Plants of the United States—Description, Symptoms and Treatment.—U. K. Chesnut has contributed a series of papers to "Merck's Report," beginning with the number for January, 1899, and continued in each number to the June number 1899, et seq., on the principal poisonous plants of the United States. These papers are illustrated by cuts of the different plants under consideration, and while it is impracticable to reproduce them here in abstract, the following enumeration of the plants described may be of service for reference:

Amanita muscaria	Fly Amanita	Jan.,	1899.
Amanita phalloides	Death Cup	"	"
Veratrum viride	American Hellebore	Feb.,	"
Convallaria majalis	Lily of the Valley	"	"
Cypripedium reginae	Showy Lady's Slipper	"	"
Cypripedium hirsutum	Large Yellow Lady's Slipper	"	"
Cypripedium parviflorum	Smaller Yellow Lady's Slipper	"	"
Agrostemma githago	Corn Cockle	"	"
Aconitum columbianum	Monkshood	Mar.,	"
Delphinium tricorne	Stagger Weed	"	"
Delphinium geyeri	Larkspur	"	"
Delphinium menziesii	Purple Larkspur	"	"
Delphinium recurvatum	Larkspur	"	"
Delphinium trolliifolium	Cow Poison	"	"

Prunus serotina	Wild Cherry	Mar., 1899.
Gymnocladus dioica	Kentucky Coffee Tree	" "
Astragalus mollissimus	Loco Weed	April, "
Oxytropis (Aragallus) lambertii	Stemless Loco Weed	" "
Crotalaria sagittalis	Rattleweed	" "
Euphorbia lathyris	Caper Spurge	" "
Euphorbia marginata	Snow on the Mountain	" "
Rhus radicans	Poison Ivy	May, "
Rhus diversiloba	Poison Oak	" "
Rhus vernix	Poison Sumac	" "
Aesculus pavia	Red Buckeye	" "
Phytolacca decandra	Polk Weed	" "
Cicuta maculata	Water Hemlock	June, "
Cicuta vagans	Oregon Water Hemlock	" "
Conium maculatum	Poison Hemlock	" "
Kalmia latifolia	Broad-leaf Laurel	" "
Kalmia angustifolia	Narrow-leaf Laurel	" "
Rhododendron maximum	Great Laurel	" "
Pieris mariana	Stagger Bush	" "
Leucothoe catesbaei	Branch Ivy	" "

Flora of Wisconsin.—Prof. L. S. Cheney observes that the native and naturalized vegetation of the region included in the state of Wisconsin has been the object of observation and investigation for more than two hundred years. The French missionaries of the latter part of the seventeenth century probably were the first to give more than passing notice to the rich and varied flora, and many are the items of interest to the botanist that found place in the reports of these courageous men to their superiors; yet, after due allowance is made, it is comparatively little of scientific value that has been accomplished by these men, and it was well along toward the middle of the present century before any considerable work was done upon the flora of the region here under consideration. Much has been done since, but the labor has been scattered, and the results are not conveniently available. In the absence, therefore, of definite knowledge concerning the vegetation in the very large area in the northern half of the state, Professor Cheney was induced several years ago to undertake a systematic botanical exploration of the state. Work along this line has been in progress since 1893, but it will take several years to complete the work. Professor Cheney, therefore, communicates preliminarily a list of those forms which have never been specifically reported for the state, or whose range within the state has been considerably extended, which may be consulted by those who may wish to use it in the form of notes, in Pharm. Archives, March and April, 1899, 41–49 and 61–73.

Irish Flora—Salient Features.—G. C. Druce has contributed a paper entitled the "Salient Features of the Irish Flora," which will be found to contain much useful information. Owing to its insular position, its contiguity to the ocean, and to the effect of the Gulf Stream, which surrounds

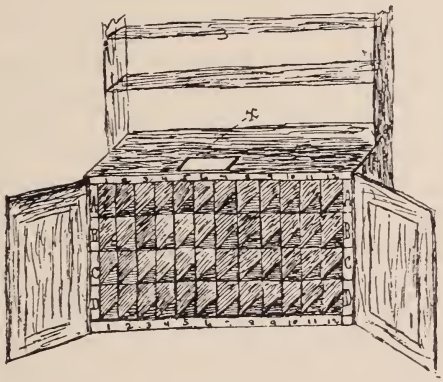
the whole coast, the climate of Ireland is more moist and equable than Britain, or, in fact, any part of Europe in the same latitude. The mean temperature of the summer months is about ten degrees lower than in Britain, the rainfall heavier, there is a more humid atmosphere and a smaller amount of sunshine than in England. All these are factors in producing a flora whose elements differ considerably from that of the adjacent island. From a table accompanying the author's paper, which he qualifies however as being only approximately accurate, it becomes apparent that the species of flowering plants are relatively much fewer in number than in England, the proportion being 18 to 10, while England is poorer by nearly three times than Spain. As compared with the latter, and to a certain extent with England, Ireland is especially deficient in large, bright-colored flowers, while the rushes, sedges and grasses which have no conspicuous flowers are represented, comparatively speaking, to a much greater extent. In a second table attention is directed to the distribution of certain types. By this it is shown that there is a greal falling off in the occurrence of what are called Germanic types, which in England attain their maximum of development in the eastern counties, while in the Scandinavian or high Alpine species, of which Great Britain has 130, only about 40 are recorded for Ireland, and occur chiefly in the north and west of the island. Going into details, the author mentions that while over 800 species found in Great Britain find the Irish Channel too wide for them to cross, there are about twenty-three species in Ireland which are not found in Great Britain; and it is mentioned as a curious fact that the common yellow rock-rose, so frequent on the English chalky hills and limestone pastures, is very rare in Ireland. It is noteworthy also that a number of plants, composing a small group, have evidently been introduced into Ireland from America.—Proc. Brit. Pharm. Conf., 1898, 378–383.

Pressed Herbs—Method of Storing.—Ed. E. Williams describes an arrangement for storing pressed herbs conveniently, utilizing the lower part of some patent medicine shelving as follows: The regular shelving is removed and replaced by a rack containing pigeon-holes 2½ inches wide by 6 inches high and 9 inches deep, each large enough to accommodate from 1 to 1½ pounds of herbs and admit of their easy removal. This arrangement is best explained by reference to the accompanying cut, Fig. 50. The rows of pigeon-holes are lettered A, B, C and D respectively and each hole is numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. In the counter shelf at X is a list of the herbs arranged alphabetically, thus:

Bittersweet ..... A—1.
Black Walnut ..... A—2.
Blue Cohosh ..... A—3.
.....
.....
.....
Catnip ..... A—4.

The vacant lines left on the list, between the different letters, are for the insertion of any new herbs that may be added to the stock, and to preserve the alphabetical order.—Amer. Drug., August 10, 1898, 65.

FIG. 50.



Pressed Herb Closet.

Plant Powders—Relation of Ash and Potassium Carbonate to the Fineness.—Dr. Karl Dieterich records the results of an extensive series of experiments which prove that a certain relation exists between the total ash, the percentage of potassium carbonate in the ash, and the drug, according to the fineness of the powder to which the vegetable drug is reduced. Experiments with senna, digitalis, belladonna, conium, hyoscyamus, peppermint, melilotus, althæa root, licorice root and rhubarb, have shown that in nearly every case the ash content increases with the fineness of the powder while the percentage of potassium carbonate decreases. Exceptions are only found in the cases of herba conii, hyoscyami, and meliloti. He explains the increase in ash on the ground that the more difficultly pulverizable plant parts, such as the ribs and stems of leaves, and the solid inorganic constituents, do not enter the composition of the coarse powders, but become a final constituent of the fine powders by virtue of the prolonged pulverization necessary to reduce it to the requisite degree of fineness. The coarse powders, requiring pulverization only during a brief period, are composed mainly of those portions of the plant that are rich in potassium carbonate and deficient in silica, while in the case of fine powders the reverse is the case.—Pharm. Ztg., Sept. 24, 1898, 684–686.

Powdered Drugs—Review of Work Related to them for the Year 1898.—Prof. Henry Kraemer has written an interesting review of the important work done during the year 1898, including the work which has been done by different investigators in various ways on vegetable drugs and which is essential and very easily applied and utilized by the expert in the study of powdered drugs. The author considers the work accomplished under a

number of subdivisions, as follows: (1) New drugs that have been described. (2) More detailed study of drugs already known. (3) Micro-chemical tests. (4) Distribution and localization of active principle. (5) Advance of pharmacopœial requirements. (6) Examination of powdered drugs. (7) Quantitative examination of powdered drugs. In concluding his highly valuable review, which cannot be profitably condensed, the author remarks that, taking a calm retrospect of the work on powdered drugs for the year 1898, it is apparent from this broad consideration of the subject that much has been accomplished. More results are at our command than the average pharmacist is trained to appreciate or apply. There are very many facts on the distribution and structure as well as constituents of our drugs which can be utilized immediately in the study of powdered drugs. The work on this subject has only been begun, and it may be said that as quickly as the sciences of botany and chemistry advance, the science of Pharmacognosy will develop and practical pharmacognosy will find its wants supplied. It must be said, however, that the greatest of all difficulties in the advancement of practical pharmacognosy is, that those who can most be served by the science of pharmacognosy do not realize that a training, commensurate with any of the other sciences, must be secured by those who are called upon to do more than imitate, and of whom it is required that the practical questions presented for solution must be answered.—Pharm. Review., Febr., 1899, 60–70.

Powdered Drugs—Microscopical Characteristics.—Prof. Smith Ely Jelliffe continues his valuable studies of the microscopical characteristics of powdered drugs, and contributes a paper on the powders of *ipecacuanha* and of *belladonna* in the December number, 1898, of the Drugg. Circular, (pp. 286–287); on powdered *male fern* in the February, 1899, number, (p. 27); on powdered *hyoscyamus* and *belladonna leaf* in the April, 1899, number (p. 74); and on *cassia cinnamon* and its powder in the May, 1899, number (p. 98) of the same journal, to which reference must be had, since the papers do not admit of profitable condensation.

Spices and Condiments—Microscopical Examination.—Burt E. Nelson contributes a series of papers embodying his observations and studies upon the microscopical examination of tea, coffee, spices and condiments, which cannot be profitably condensed and must, therefore, be referred to in the original. This series begins with the October 15, 1898, number of Merck's Report and is concluded in the number for December 15, 1898.

Proximate Plant Analysis—Common Error in Recording Results.—Referring to his analysis of "Yerba Reuma" (which see), Lyman F. Kebler draws attention to a common error in recording results of proximate plant analysis. In summing up the results, the percentage of ash is usually added to the per cent. of the other constituents to make up the 100 per cent. Some of the ash constituents being soluble in the solvents employed, these are recorded as soluble in certain solvents, and thus the

same substance is recorded twice. If the author had done this in the case of his analysis of yerba reuma, his results would have shown—what is impossible in fact—126.41 per cent. of constituents in the sample. If an ash must be recorded in the summary, the proper material to estimate it in is the dried residue left after action of all the solvents employed in course of an analysis.—Amer. Journ. Pharm., Jan., 1899, 25–26.

Gums, Resins and Similar Substances—Classifications.—Frederick L. Lewton, of the Philadelphia Museums, applying the terms "gums," "resins," and "similar substances," only to those plant exudations and prepared substances of similar appearance, which are popularly or commercially known as gums, resins, balsams and rubbers, proposes a system of classification which is briefly outlined in the following: Preliminarily it must be mentioned that the author's definition excludes pectic substances and numerous gums, resins and mucilages occurring in small amounts in the tissues of many plants, which should find a place in a complete scientific classification of resinous and gummy substances.

Section I. True Gums.—Plant exudations, or prepared vegetable substances, which dissolve or soften in cold water, forming a mucilage, or at least a liquid of a gelatinous consistency. Insoluble in 60 per cent alcohol; yield mucic and oxalic acids when treated with nitric acid; converted into dextrin and finally into sugar by sulphuric acid.

Sub-Section 1. Arabic Group.—Examples: Acacia, feronia, acajon gums.

Sub-Section 2. Cherry Group.—Examples: Cherry, peach, apple-tree gums.

Sub-Section 3. Tragacanth Group.—Examples: Tragacanth, nopal, moringa, cocoanut gums.

Sub-Section 4. Dextrin Group.—Examples: Dextrin, British gum.

Sub-Section 5. Seaweed Group.—Example: Japanese Isinglass.

Section II. True Resins.—Hard, friable, lustrous, vegetable substances, externally resembling gums, but which neither dissolve nor soften in cold water. They burn with a bright, smoky flame, contain much carbon, little oxygen, and no nitrogen, and are complicated mixtures of the resin acids.

Sub-section 1. Copal Group.—Examples: Amber, Zanzibar and African copals.

Sub-section 2. Dammar Group.—Examples: Dammar, kauri gum, American copal.

Sub-section 3. Sandarac Group.—Examples: Sandarac, mastic, Manila copal, guaiac resin.

Sub-section 4. Colophony Group.—Example: Common resin.

Sub-section 5. Benzoin Group.—Examples: Benzoin, acaroid resin, East Indian dragon's blood.

Sub-section 6. Lac Group.—Examples: Stick lac, seed lac, shellac.

SECTION III. INODOROUS GUM RESINS.—Plant exudations, having no pronounced odor, containing no volatile oil, composed of gum and resin, and forming an emulsion with water. Examples: Gamboge, South American hog-gum.

SECTION IV. ODOROUS GUM RESINS.—Plant exudations, containing besides gum and resin, also volatile oil, and having a distinct odor, which may be fetid or fragrant.

Sub-section 1. Asafetida Group.—Examples: Asafetida, galbanum, ammoniac, opoponax, gardenia resin.

Sub-section 2. Myrrh Group.—Examples: Myrrh, bdellium, olibanum, "gomart" resin.

SECTION V. OLEO RESINS.—Plant exudations consisting of resin mixed with volatile oil in various proportions; the resin frequently dissolved in the latter, forming a liquid.

Sub-Section 1. Lacquer Group.—Examples: Cardol, Chinese, Japanese, Burmese and Indian lacquers.

Sub-Section 2. Copaiba Group.—Examples: Copaiba, gurjun balsam or "wood-oil."

Sub-Section 3. Turpentine Group.—Examples: Crude turpentine, Canada balsam, galipot.

Sub-Section 4. Elemi Group.—Examples: Manila and Brazilian elemi, Mexican "copal," tacamahac.

SECTION VI. TRUE BALSAMS.—Plant exudations consisting of resin mixed with aromatic acids, alcohols and esters. Examples: Storax, liquid amber, balsam of Peru, balsam of tolu.

SECTION VII. VOLATILE OILS.

Sub-Section 1. Camphor Group.—Examples: Camphor, borneol, menthol.

Sub-Section 2. Terpene Group.—Wood-tar, tar and rosin oils, oil of turpentine. The majority of essential oils, though of the same composition, are not classed with the gums and resins.

SECTION VIII. MILKY SAPS (not included before).

Sub-section 1. Rubber Group.—Examples: Rubber, gutta-percha, balata, chicle.

Sub-section 2. Opium Group.—Examples: Opium, lactucarium, scammony, euphorbium.

SECTION IX. INSPISSATED SAPS AND EXTRACTS.—Plant exudations or inspissated saps, consisting of gum or resin, or both, associated with astringent and bitter principles, alkaloids, glucosides, etc.; or inspissated extracts of similar composition.

Sub-section 1. Kino group.—Examples: Malabar, Bengal and Australian kinos, West Indian dragon's blood, Mochras gum.

Sub-section 2. Hemp Group.—Example: Charas.

Sub-section 3. Aloe Group.—Different kinds of aloes.

Sub-section 4. Extract Group.—Examples: Gambir, cutch, catechu, quebracho, licorice paste, curare.—Amer. Jour. Pharm., June, 1899, 270–274.

East African Tanbarks—Determinations of Tannin.—Dr. W. Busse reports upon a number of "Mangrove" barks from German East Africa, which promise to supply excellent material for tannin.

Rhizophora mucronata, Lam., "Mkoko mkaka."—The inner air-dry bark contains a brown coloring matter, and about 47.99 per cent. of tannin.

Ceriops Candolleana, Arn., "Mkoko mkandaa."—The inner bark contains, besides a red-coloring matter, an average of 42.27 per cent. of tannin, calculated for the air-dry material.

Brugiera gymnorrhiza, (L) Lam., "Mkoko mshenzi."—The inner bark contains from 44.71 to 53.12 per cent. of tannin, and a red-brown coloring matter.

Xylocarpus Granatum, Koen. and *X. ovatus*, A. Juss., "Mkamavi" or "Mkomavi."—The bark from one of these species, which has not been determined, contained on an average 40.49 per cent. of tannin, but the percentage varies widely in different samples. It contains a red coloring matter.

Sonneratia Caseolaris, L., "Mkoko mpia" or "Milana."—This bark contains only 15.51 per cent. of tannin, and no coloring matter.

Heritiera litoralis, Dryand, "Sikundazi," "Mkunka."—The bark of this plant is also devoid of coloring matter, and contains an average of about 14 per cent. of tannin.

The author observes that experiments made with similar tanning materials during the past year in the School of Tanners at Freiburg i. S., gave no such favorable results. But he attributes the difference to possible damage by rain during storage, etc., and largely to the fact that much of the material was collected from immature plants.—Apoth. Ztg., Dec. 17, 1898, 877.

Arrow Poisons—History, Sources, Constituents.—Dr. Ralph Stockman delivered an inaugural sessional address to the North British Branch of the Pharmaceutical Society, in which he very interestingly describes the history, sources and constituents of the arrow poisons that have been in use during the earliest times and those that are now in use among uncivilized people in various countries. As an exhaustive treatise on the subject, this address may be consulted in Pharm. Journ., Nov. 26 and Dec. 3, 1898, pp. 548–550 and 585–587.

"Husa"—A Remedy for the Opium Habit.—W. W. Winthrop reports on the valuable properties of "husa," an undetermined plant supposed to be a cryptogam of one of the higher orders. It is collected in the everglades of Florida where it grows in clumps in moist, shady places, and is

said to be a perfect antidote for snake bites, stings of insects, etc., as well as for narcotic poisons. Its chief usefulness is said to lie in its remarkable effectiveness against the opium habit. It sustains the patient while the system frees itself from the drug, and is given in graduated doses to avoid the formation of a "husa" habit. Dr. Winthrop has seen cases of a great many years' standing cured in about ninety days, and in no case has the remedy been known to fail. The active principle, *husin*, consists of white, very light, flocculent minute crystals which agglomerate to form lumps when exposed to the air. It is as poisonous as atropine or strychnine, one-fourth of a grain causing a violent beating of the heart accompanied by a state of mental elevation. This stage is followed by quiet, languor and sleep.—Pharm. Review., November, 1898, 426; from N. Y. Med. Journ., *67*, 538 and 906.

Husa—A Concoction Containing Morphine Sulphate.—The foregoing positive statements concerning the valuable properties of "husa" would seem to leave little to do except to determine the botanical source of the drug possessing the remarkable effectiveness attributed to it. Prof. John Uri Lloyd, with his usual thoroughness, has endeavored to find out something concerning the source, botanical character, and chemistry of "husa," and communicates the results of his investigation in a paper which will prove interesting reading. It may suffice here to say that all endeavors to obtain the plant itself, or portions of it, have been met with uniform refusal on the ground that the plant does not bear transportation, and that therefore an extract of "husa" is prepared at the point of its collection in Florida. There appeared, however, no difficulty to obtain the remedy supplied to physicians for the treatment of patients afflicted with the opium habit. This is supplied in ten vials, containing altogether about one quart of liquid, which has been subjected to careful analysis by Prof. Lloyd, on the basis of which he defines "Husa" as follows: "A solution of morphine sulphate to be administered under the name 'Husa,' and only by physicians. It is sold to physicians at the rate of $10 for about 234 grains of morphine."

Prof. Lloyd read his paper at a joint meeting of the Cincinnati Section of the American Chemical Society and the Cincinnati Academy of Pharmacy, University of Cincinnati, March 15, 1899, and submitted in support of his above expressed view the testimony of his experiments, together with the morphine obtained from 25 Cc. of liquid taken from each of the ten vials analyzed. Besides morphine sulphate, this concoction contains about 0.16 per cent. salicylic acid, 12 per cent. alcohol, 10 per cent. glycerin, and enough water to make up a desired volume, the whole being colored—probably with burnt sugar.—Amer. Jour. Phar., May, 1899, 210–217.

ALGÆ.

Dictyoda Dichotoma—Process of Reproduction.—J. Lloyd Williams has

investigated the reproduction of *dictyoda dichotoma*, an annual which germinates during the summer, remains small during the winter, and grows rapidly in June, beginning to form reproductive cells in July. The tetraspores are produced throughout the season; the sexual cells, however, show a remarkable periodicity. The formation, maturation and liberation of each crop occupies a fortnight, the interval between two spring tides. The oospheres on liberation have no walls, attract antherozoids, become fertilized and at once start germination. If not fertilized the eggs lose the power of attracting antherozoids and form walls, but after a few divisions the process stops and the plantlets die.—Pharm. Journ., Dec. 31, 1898, 689; from Annals of Botany, xlviii., 559.

BACILLARIEAE.

Bacteria—Occurrence in Hail Stones.—F. C. Harrison, of Guelph, Ontario, has examined hail stones bacteriologically on two separate occasions, and found a number of bacteria to be present in them. Among them were *Penicillium glaucum*, *Mucor sp.*, *Aspergillus sp.*, *Bacillus fluorescens liquefaciens*, *B. fluorescens non-liquefaciens*, a form of *Proteus vulgaris*, and two new micro-organisms for which he proposes the names *Bacillus flavus grandinis* and *Mucor melleus grandinis* respectively.—Phar. Jour., Oct. 22, 1898, 437; from Bot. Gaz., xxvi., 211.

Bacteria—Artichokes as a Culture-medium.—Roger believes that the artichoke possesses certain advantageous qualities as a medium for bacterial culture, and recommends their use as follows: After having stripped off the scales, care being taken to preserve the fibres, the thick part of the artichoke is cut into little cubes. These are placed in tubes, plugged with damp wadding, the fibres being uppermost, so that the culture-medium is represented by a fleshy mass surmounted by a sort of tuft. After the wadding has been inserted, the whole is heated in an oven to 115° C. for a quarter of an hour. In making inoculations the germs must be deposited at the point of insertion of the flowers.—Pharm. Journ., Oct. 29, 1898, 457; from Lancet, *3909*, 285.

Tubercle Bacillus—Chemical Examination.—According to Koch, if the tubercle bacilli are triturated with water, an emulsion is obtained from which the extracted bacilli, and the solution produced, may be separated by centrifugation. The yellowish, fairly opalescent fluid obtained in this way has been subjected to chemical examination by Dr. W. G. Rappel, who finds it to be either faintly alkaline or perfectly neutral. It is free from coagulable albuminoids, gives of the various color reactions of the proteins only the biuret reaction, and precipitates true albuminoids from their solution. Acetic acid produces an abundant precipitate, insoluble in excess, but soluble in dilute alkaline solutions, from which it is reprecipitated by acids. The substance so precipitated contains about 4 per cent of phosphorus, from which it may be freed by the method of Kossel. Yielding

the biuret reaction, precipitating the true albuminoids as well as the primary albumoes from their ammoniacal solution, this body is doubtless a protamine, and the author proposes for it the name

Tuberculosamine, which exists in the tubercle bacilli in combination with a nuclein acid. The latter, indeed, is present in excess in the fluid from which the protamine compound has been separated, and by a simple method described has been separated by the author. It is a powdery substance, which the author has named

Tuberculinic Acid.—It is soluble in water, particularly in presence of small quantities of alkali, gives no albumin reaction, but, on the contrary, precipitates true albuminoids, and contains, as obtained, 9.42 per cent. of phosphorus.—Apoth. Ztg., Feb. 18, 1899, 89.

FUNGI.

Fungi—Poisonous Italian Varieties.—Prof. G. Arcangeti gives the following list of seven species of poisonous Italian fungi: *Amanita phalloides, amanita muscaria, amanita panterina, armittaria tumescens, pleurotus olearius, boletus luridus*, and *boletus satanas*. He records a case of poisoning in Italy by *amanita verna*, which, however, the author regards merely as a variety of *amanita phalloides*.—Pharm. Journ., April 1, 1899, 295; from Alli. Soc. Tosc. Sci. Nat., *11*, 92.

Fungi—Simple Rules of Distinction between Edible and Poisonous Kinds.—Dr. W. G. Farlow has prepared for the Department of Agriculture the following simple rules by which edible and poisonous fungi may be distinguished:

1. Avoid fungi when in the button or unexpanded stage; also those in which the flesh has begun to decay, even if only slightly.

2. Avoid all fungi which have a stalk with a swollen base surrounded by a sac-like envelope, especially if the gills are white.

3. Avoid fungi having a milky juice, unless the juice is reddish.

4. Avoid fungi in which the cap or pileus is thin in proportion to the gills, and in which the gills are nearly all of equal length, especially if the pileus is bright colored.

5. Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish, and in the case of other tube-bearing forms experiment with caution.

6. Fungi which have a sort of spider web or flocculent ring around the upper part of the stalk, should in general be avoided.—Pharm. Review, Jan., 1899, 16; from Bot. Gaz., *26*, 221.

Fungi—Varieties Causing the Rotting of Fruit.—Dr. J. Behrens has identified the fungi which cause the rotting of apples, pears, plums, cherries, apricots, grapes, currants, tomatoes, walnuts, etc., to be *botrytis vulgaris, penicillium glaucum, penicillium luteum, mucor stolonifer*, and *oidium fructigenum*. Of these, *botrytis vulgaris* differs from the others

in attacking all parts of the plant, producing a poison which kills living protoplasm.—Pharm. Journ., April 1, 1899, 295; from *Centralbl. f. Bact.*, *4*, 1898.

Fungi.—Several new species found in *Ambergris*, which see under "Animal Drugs."

Fungi—Effect of Chemical Substances on the Germination of the Spores.—F. L. Stevens has studied the effect of various chemical substances, in aqueous solution, upon the germination of fungus spores. He finds mercuric chloride to be the strongest in its toxic action, whilst potassium cyanide is remarkably weak in this respect. Various fungi offer different resistance to poisons, and the limits of resistance vary in the same species. Alcohol and sodium chloride have a stimulating effect on spores. The results of the investigation in general are in accord with the theory of hydrolytic dissociation.—Pharm. Journ., Jan. 21, 1899, 52; from Bot. Gazette, *26*, 377.

Saccharomyces—Presence of a Nucleus.—H. Wagner finds what he calls a "nuclear apparatus" in all species of the *saccharomyces* examined by him—in *s. cerevisiæ*, *s. ludwigii* and *s. pastorianus*, thus apparently settling the vexed question of the presence of a nucleus in the yeast plant. In the earlier stages of fermentation this consists of nucleole, in close contact with a vacuole containing a granular chromatin network, and probably the result of the fusion of smaller vacuoles. The nucleole is invariably present in all stages. In the process of budding, the division of the nuclear apparatus does not exhibit any definite karyokinetic stages; the nucleole divides directly into two daughter-nuclei. This division takes place either in the neck which connects the bud with the mother-cell, or less often in the mother-cell itself.—Pharm. Journ., May 20, 1899 451; from Ann. of Bot., *12*, 499.

Yeast—Conditions Favorable to its Growth.—A series of experiments have been made by Dr. A. L. Stern to determine the amount of inorganic and nitrogenous nutriment required to produce the largest crop of yeast, the greatest assimilation of nitrogen, and the most complete fermentation in a fixed time. The yeast employed was a pure form obtained from a Burton pitching yeast, the sugar was *d*-glucose, the nitrogenous nutriment asparagin, and the inorganic nutriment of two kinds—the first prepared from a yeast ash and free from sulphur, the second a mixture of potassium phosphate, magnesium sulphate and calcium sulphate. Each experiment consisted in fermenting 500 Cc. of a 10 per cent. solution of the sugar, to which varying amounts of the nitrogenous and inorganic nutriments had been added. The author finds that sulphur is an essential constituent of yeast nutriment, and that in the absence of other more suitable forms of sulphur nutriment, sulphates can supply the yeast with this element, a portion of the sulphate being invariably reduced to hydrogen sulphide. Attempts were made to find a substance of known constitution which

could supply yeast with sulphur without the evolution of hydrogen sulphide, but without success. No evidence could be obtained in support of the statement that iron is an essential constituent of yeast nutriment. From the results of his experiments the author draws the following conclusions: Any increase of nutriment beyond a definite limit will not materially increase the amount of nitrogen assimilated by the yeast, the percentage of nitrogen in the yeast, the weight of the yeast, or the amount of sugar fermented. This limit, called the normal supply, is the largest quantity that the yeast can assimilate under the conditions employed in the experiment, and is approximately 0.025 Gm. of inorganic nutriment per 100 Cc., and the same weight of nitrogen supplied as asparagin.—Pharm. Journ., Nov. 19, 1898, 525 ; from Proc. Chem. Soc., 198, 182.

Yeast—Occurrence of Carbohydrates in the Cells.—L. Errera, confirming his former researches on the structure of the cells of *saccharomyces cerevisiæ*, asserts that carbohydrates are stored up in yeast in the form of glycogen, which accumulates or disappears from the vacuoles very rapidly, according to conditions of nutrition or growth.—Pharm. Journ., Dec. 31, 1898, 689 ; from Annals of Botany, xlviii, 567.

Yeast—Use as a Dietetic.—O. Grossert and F. Lichinger prepare a nutrient extract from brewer's yeast, after freeing it from certain contaminants, such as lupulin, &c. For this purpose, the yeast is strained under moderate pressure into water, the water is decanted, and the residue is heated with steam for several hours. The new liquefied mass is filtered, evaporated to dryness, and powdered. It is soluble in water, and, containing large quantities of protein substance and phosphates, constitutes an excellent nutrient, which may be mixed with flour, &c., and used for bread, crackers, &c.—Apoth. Ztg., Dec. 28, 1898, 901.

Ergot—Preservation in an Atmosphere of Formaldehyde.—Pées proposes that carefully selected ergot be preserved by placing it in a well-dried bottle, closed with a cork stopper to which, by the aid of a wire, a glass tube, closed at the bottom, is attached. The tube is filled with granulated potassium sulphate, saturated with formaldehyde ; the latter being replaced by a few drops from time to time according to the necessity of opening the container. The ergot is said to keep for a long time when preserved in this way, but it is not stated what untoward influence, if any, the formaldehyde may itself exert on the ergot.—Apoth. Ztg., Feb. 15, 1899, 85 ; from Bull. Commerc., 1899, 39.

LICHENES.

Lichenes—Presence of Emulsin.—Bourquetol's observation that most fungi, especially those parasitic on trees, secrete a ferment which, like emulsin, is capable of hydrolyzing glucosides, has led Hérissey to look for emulsin in lichens, since they are partly fungal in their nature. As a result he has found an emulsin-like body to be present in all lichens

which he has so far examined, viz.: *Usnea barbata, physcia ciliaris, parmelia caperata, peltigera canina, pertusaria amara, cladoni pyxidata, evernia furfuracea, ramalina fastigiata,* and *ramalina fraxinea.* The emulsin was detected by placing 0.4 to 1.2 Gm. of the bruised lichen in contact with a solution of 0.2 Gm. amygdalin in 20 Cc. of water saturated with thymol, and exposing the mixture to a temperature of 35° C. On the next day, prussic acid was sought for and proved to be present by distilling a portion of the mixture, and applying the proper reagents for prussic acid to the distillate. Glucose was detected in the original mixture by the use of Fehling's Solution.—Pharm. Journ., July 23, 1898, 73; from Jour. de Pharm. et Chim., 1898, 577–580.

Iceland Moss.—Investigation concerning "*Lichensteric Acid*" which see under "Organic Chemistry."

FILICES.

Aspidium Filicis Maris—Review of Its Chemical, Therapeutic and Toxicological Character.—Dr. F. Düsterhahn communicates a lengthy paper in which he reviews the observations that have been made from the earliest times to the present, concerning the therapeutic, toxicological and chemical character of male fern and of its oleo-resin. This valuable paper, which cannot be profitably abstracted, may be consulted in Apoth. Ztg., Oct. 8, 12, 15 and 19, 1898, pp. 713, 720, 729 and 734.

Aspidium Filix Mas — Influence of Soil and Locality of Growth Upon the Ether-Soluble Constituents of the Rhizome.—Fr. Bellingroot communicates the results of experiments made to determine the amount of oleo-resin obtainable from male fern rhizomes grown in different localities and in different soils, which show that there is not only a difference in the yield, but also in the percentage of filicic acid contained in the oleo-resin, dependent on soil and location. He has found that inferior yield and quality of oleo-resin generally go together, and that the best yields are obtained from rhizomes grown in mountainous regions. Thus, rhizomes grown in the Rhenish lowlands yielded from 5.90 to 6.12 per cent. of oleo-resin, and this contained only from 5.75 to 5.90 per cent. of pure filicic acid; while rhizomes grown in mountainous regions—the Voreifel, Hocheifel, Taunus, Werterwald, and Hunsrück—yielded in round numbers from 9 to 10 per cent. of oleo-resin, and the oleo-resin contained from 8 to 10.5 per cent. of pure filicic acid. The author has also examined nine samples of oleo-resin of male fern, five from pharmacies and four from wholesole dealers. The first five yielded respectively 10.13, 5.60, 9.37, 7.09 and 7.06 per cent. of pure filicic acid; the last four, 5.87, 6.86, 5.66 and 6.75 per cent. respectively.—Apoth. Ztg., Dec. 14, 1898, 869.

Aspidium spinulosum—Practical Identity of the Ethereal Extract with that of Male Fern.—The recommendation by Laurens of the oleo-resin of the rhizome of *aspidium spinulosum* as an efficient substitute for the oleo-

resin of male fern, is supported by the observations since made by Poulsson, who finds that the most important constituents of the rhizome are intimately related to the filicin of the male fern rhizome, both in their chemical and physiological characters. These constituents are according to Poulsson the following: *Polystichin*, *polystichnin*, *polystichocitrin* and *polystichoflavin*. They are all insoluble in water, more or less readily soluble in ether, acetic ether, benzol, toluol, chloroform and acetone, sparingly soluble in amyl-alcohol and in methyl-alcohol at the ordinary temperature, but readily by the aid of heat. They are readily soluble in caustic alkali solutions, if these are not too dilute, but sparingly only in solutions of alkali carbonate. The solutions in caustic alkalies are, however, generally decomposed on heating. Their alcoholic solutions are colored in different tints from red to brown by ferric chloride. They are all soluble in concentrated sulphuric acid, and when these solutions are carefully heated they become deep red and develop an intense odor of butyric acid. The pharmacological action of these bodies is, with insignificant deviations, analagous to that of filicin.—Pharm. Ztg., Nov. 5, 1898, 793.

GRAMINACEÆ.

Lolium Temulentum—A Fungus Mycele the Source of the Poisonous Principle..—P. Guérin has detected in the seeds of darnel—*lolium temulentum*—the constant presence of a fungus mycele, to which he attributes the production of the poisonous principle—temulin—which they contain. This principle was found in the outermost layer belonging to the nucellus beneath the integument. The hyphæ are abundantly septated. The same fungus was found also in other species of *lolium* which have a poisonous reputation, as *L. arvense* and *L. linicola*, but not in *L. italicum*. The systematic position of the fungus was not determined.—Pharm. Journ., March 18, 1899, 251; from Morot's Journ. de Bot., 1898, 230.

Wheat Flour—Detection of Maize as Adulterant.—To detect an admixture of wheaten flour with maize, a not infrequent occurrence, the German official authorities have recommended that the sample be macerated with 8 Gm. chloral hydrate and 3 Gm. water for 24 hours, when the starch of maize will be found non-gelatinized. K. Baumann, however, finds that this process is not available, since the maize starch does gelatinize before the expiration of the period named. He proposes instead the following test: About 0.1 Gm. of the flour is shaken several times, to prevent deposition, with 10 Cc. of potassa solution, and the liquid is nearly neutralized with hydrochloric acid *after standing 2 minutes*. If the flour is produced from maize, it remains perfectly intact. To determine its presence in wheaten flour quantitatively, it is compared with mixtures of known composition.—Pharm. Centralh., March 2, 1899, 143.

PALMACEÆ.

Saw Palmetto— Chemical Examination of the Fruit.—P. L. Sherman and C. H. Briggs have made a very exhaustive chemical examination of the fruit of the saw palmetto—*sabal serrulata*—in the Laboratory of General Chemistry of the University of Michigan. The fruit ripens in October and November, but is collected from August until January, being placed in barrels and preserved for future use by adding a small amount of alcohol. When required, the fruit is crushed and the oil-bearing juice isolated by hydraulic pressure, the remaining pulp yielding an additional amount of oil on treatment with warm water and again pressing. The oil, dissolved in alcohol, is then ready for use. One hundred pounds of fruit bruised in this way yielded five gallons of juice and 685 Gm. of oil. The nuts, separated from the pulp mechanically, weighed 17½ pounds, and contain about 12 per cent of an oil which differs entirely from that obtained from the pulp. The

Oil of the Fruit Pulp was subjected to fractional distillation. From 500 Gm. of oil which had been extracted from fruits ¾ ripe, the first portion of 32 Gm. contained the volatile oil of the saw palmetto. This had the odor of the fruit. The next several fractions were white solids, while the highest fraction, passing at 230–270°, was again liquid, a black, semi-solid residue amounting to 45 Gm. remaining in the retort. The several fractions obtained were found to consist of several fatty acids as well as their ethyl esters, the following having been identified and described: Caproic, caprylic, capric, lauric, palmitic and oleic acids and their ethyl esters. The

Oil of the Nuts, which are remarkable for their exceeding hard character, was obtained by extraction with boiling benzene. It is a thick liquid having a greenish color, and has not the characteristic fruity odor that is possessed by the oil of the fruit pulp. It is insoluble in water, slightly soluble in alcohol, almost entirely insoluble in dilute aqueous potash, but readily soluble in benzene, chloroform and ether. It contains only small quantities, not exceeding 2.3 per cent., of free fatty acids, and is mainly composed of the glycerides of caprylic, capric, lauric, palmitic, stearic and oleic acids.

The authors also searched for alkaloidal constituents in the fruit, but failed to obtain the slightest indication of the presence of such constituents. They found the fruit to contain about 5.4 per cent. of sugar, which is present mainly as invert sugar. A small amount of pentoses was also found, and identified by the color test with phloroglucin. Pharm. Archives, June, 1899, 101–116.

Bananas—Preparation and Use of Meal.—Warburg gives some useful information concerning the preparation and use of "banana meal" which, in Guiana, is known by the name of

Conquintay, and there, by the Creoles, held in high esteem as a food

for children and the sick. It is likewise used occasionally in the West Indies, whilst in India and the Malay Archipelago it has been known from antiquity as a valuable food product. Its introduction into use in Europe and North America has heretofore not met with much success, but recently a product from Torak on the Malayan peninsula has met with much favor in London. For the preparation of the meal, the bananas are peeled, cut in thin slices, and dried in a drying apparatus; then ground in an ordinary flour mill and sifted. The yield is 20 to 25 per cent. of the fruit, which, unless it is of the mealy variety, must be used in the unripe state. The mealy banana contains more starch and less sugar than the banana that is usually eaten ripe. The principal difficulty encountered in its introduction into Europe is the failure to supply a pure-white meal, owing to the formation of a coloring matter which, it is claimed, is difficult to remove even with the strongest bleaching material.—Apoth. Ztg., Sept. 10, 1898, 637; from Ztschr. trop. Landwirtsch. II., 1898, No. 7, 231.

Bananas—An Excellent Food in Typhoid Fever.—Wm. C. Ussery calls attention to the fact that bananas are an excellent food for typhoid fever patients, for the reason that there is such a small part of excrementitious matter in their composition that they do not irritate the ulcerative condition of the mucous membrane of the intestines. Almost the entire amount of the fruit eaten is at once absorbed as nutritive material.—Pharm. Review, April, 1899, 176; from "Ephemeris," 5, 2141.

Cœlococcus Solomonensis—A Valuable Sago Palm of the Solomon Islands.—Warburg gives some interesting information concerning the "ivory-nut" palm of the Solomon Islands, which is closely related to the true sago palm, and, according to Swayne, is used by the natives of Shortland and Treasury Island for preparing sago from the pith of its trunk. The nuts of this and allied species of *cœlococcus* are largely exported to England from the islands, as well as from Australia and other parts of Polynesia, furnishing the so-called vegetable ivory. The sago is prepared by simply washing the pith with sea water, the starch is formed into cakes which are enveloped in leaves and baked, pounded almonds being sometimes added. Prepared in this way, an excellent food is produced. Occasionally the pith of the tree is baked by itself. According to Guppy, the palm is more abundant on the islands under the German protectorate, than on the more easterly English Islands. It attains a height of from 60 to 70 feet, but lives only 20 years. Warburg, in view of the variety of uses of this palm, recommends its culture in the German tropical colonies. —Apoth. Ztg., Dec. 3, 1898, 849; from Tropenpflanzer, II, 1898, No. 8.

Taro Biscuits—A Valuable Food Product from a Poisonous Plant.—H. Thoms has subjected the taro-biscuits ("taroschnitte") of New Guinea to chemical examination. They are prepared from the tubers of

Colocasia antiquorum, Schott, a plant which is cultivated in Japan and the South Sea Islands, in the West Indies, etc., for the purposes of food.

The tubers are said to be quite acrid and poisonous in their fresh condition, but lose these properties completely on boiling or baking. The biscuits examined by the author were in the form of small, flat, contorted, hard pieces of a whitish color, brown on the edges. They are evidently obtained by reducing the tubers to a magma, forming flat cakes, and baking these moderately on flat tins. The biscuits were apparently thoroughly dried, and yielded on analysis: Water, 11.59; ash, 2.33; fat, 0.28; starch, 56.988; nitrogenous substances, 2.85 per cent. The fresh tubers have been analyzed by Fescas, who describes their composition in "Japanische Landwirthschaft," as follows: Water, 81.20; nitrogen, 0.31; ash, 0.82; crude protein, 2.0; crude fibre, 0.70; nitrogenous constituents, 15.10; fat, 0.20 per cent. According to Hartwich the plant is a native of Egypt, but is now found everywhere in the tropics. It is known in Brazil as "Inhame," and "Inhame branco;" the juice of the tubers produces reddening of the skin, and appears to have anthelmintic properties when diluted. A variety of this plant, *colocasia antiquorum*, Schott, var. *acris*, Engler, is known in Brazil as "Inhame terra," and "Inhame bravo." The juice of the tubers of this plant is also acrid, and is said to be a violent abortive. The name "taro" is of Indo-Malayan origin.—Apoth. Ztg., Dec. 3, 1898, 849; from Tropenpflanzer II, 1898, No. 8.

COMMELINACEÆ.

Commelina, Sp. ?—Proximate Estimation.—Gilbert Kent Preston has described the botanical and microscopical features of a species of *commelina*, which he collected on the banks of the Wissahickon near its junction with the Schuylkill. It was supposed by Godfrey Aschmann, a Philadelphia florist, to be *C. virginica*, but the author's examination led him to the opinion that it is either *C. nudiflora* or C. *communis*. Mr. Aschmann had found an ointment prepared from the plant to possess hemostatic properties, and to exhibit in other respects remarkable healing properties, which is in accordance with observations made by Alfonso Herrera with several Mexican species of *commelina*, which are there known under the name of "Yerba del Pollo." The plant was analyzed by G. L. Genz several years ago, but the analysis yielded no principles to which its supposed activity could be attributed. Mr. Preston has now subjected the plant to proximate examination, with results which may be briefly enumerated as follows: After drying the fresh plant for several days, it lost 9.65 per cent. on completely drying it at 110° C. to constant weight. It yielded 15.33 per cent. of a brown ash, of which 38.03 per cent. was soluble in water, and consisting chiefly of potassium chloride and sulphate, with a little potassium carbonate. Hydrochloric acid dissolved 44.72 per cent., containing calcium, magnesium, iron and phosphoric oxide. The remaining 17.25 per cent. of the ash was silicious matter. Subjecting the plant to Dragendorff's method of analysis, petroleum ether extracted 1.56

per cent. of substance, consisting of 0.13 per cent. of caoutchouc, 0.48 per cent. of wax, and 0.95 per cent. of fat. Ether then extracted 1.24 per cent. of substance, 14.54 per cent. of which was soluble in water, 67.69 per cent. then soluble in alcohol, leaving 17.77 per cent., of insoluble residue. Absolute alcohol then extracted 1.04 per cent. of which 84.97 per cent. was soluble in water. Cold water now extracted 16.34 per cent., and acidulated water 13.30 per cent. of extract. The amount of starch was determined to be 0.18 per cent., the undetermined residue, insoluble in the different solvents, amounting to 30.95, and representing the cellulose, lignin and similar organic components of the plant. Neither volatile oil nor acids were obtained by distillation, nor could the presence of an alkaloid be proven; for, although phosphotungstic acid afforded a large whitish precipitate in suitably prepared acid extraction of the plant, potassium tri-iodide, Mayer's reagent, and gold chloride gave only slight precipitates, while picric acid, mercuric chloride, and platinic chloride gave no precipitate at all. The author's botanical description of the plant is illustrated by 8 cuts, showing the plant and its principal microscopical features.—Amer. Journ. Pharm., July, 1898, 321–335.

SMILACEÆ.

Sarsaparilla—Botanical and Microscopical Character.—Prof. Smith Ely Jelliffe gives a botanical description of the chief varieties of sarsaparilla, and their microscopical characteristics, which cannot be profitably condensed and must, therefore, be consulted in the origiual. The paper is illustrated by cuts showing the microscopical characteristics of Honduras and Jamaica sarsaparillas, in cross section, as well as of a sample of powdered Honduras sarsaparilla. This has been selected because a mixture of several sarsaparillas is well nigh impossible to detect The chief microscopical characteristics are starch, crystals, parenchymatic cells, both thick-walled and thin-walled, hairs, endodermis sheath cells, vessels, fibres, and phloem elements.—Merck's Rep., Feb. 1899, 52–53.

Spurious Sarsaparilla — A New Sophistication. — At the Düsseldorf meeting of German Naturalists and Physicians, Dr. Hartwich exhibited and described a spurious form of sarsaparilla, which, while resembling genuine sarsaparilla in its external characters and in its anatomical structure, gave evidence of decided difference in its chemical constituents. It contained neither calcium oxalate nor starch, sugar being found in place of the latter. The drug was received from the Amazon, and is doubtless derived from a plant of the *liliaceæ*, but its precise botanical origin remains to be determined.—Pharm. Ztg., Sept. 24, 1898, 684.

LILIACEÆ.

Aloe Socotrina—Monograph.—Prof. John Uri Lloyd closes a series of fifteen monographies of medicinal plants, contributed to the "Western

Druggist," with one on *aloe socotrina*, and incidentally gives a description of the commercial varieties of aloe and their sources. Concerning the botanical designation "aloe socotrina," the author observes, "The name aloe socotrina was undoubtedly derived from the island of Socotra, off the entrance to the Red Sea. Yet some authors maintain that this appellation was by some given to the inspissated juice of aloe (*succus citrinus*) on account of the lemon-yellow color of its powder." Prof. Lloyd's monograph will be consulted with profit by students interested in the subject of aloes.—West. Drug., August, 1898, 338–342.

Uganda Aloes—A New Variety.—E. M. Holmes describes a new variety of aloes, imported from Uganda, which is characterized by the evident care taken in its preparation. It occurs in 4 lb. bags of coarse powder, 4 lb. bags of fine grains, 4 lb. bags of coarse grains, 4 lb. bricks wrapped in red paper, and in chips, the bags being stamped with a crown, and the red wrappers bearing the inscription "All 'Crown' aloes is sun-dried, and is guaranteed absolutely pure." The bricks are of a hepatic brown color, externally dusted over with a brownish-orange powder, and the surface is marked with numerous slender, oblique cracks. The transverse surface where broken presents a resinous fracture, with a bronzy-gold lustre. Splinters of it are translucent, as in Socotrine and Zanzibar aloes, but have not the garnet-red tint present in good samples of these varieties. The odor is very aromatic, and intermediate between Cape and Socotrine aloes; the taste is aromatic and very bitter. With strong nitric acid the powder forms a brown solution, but gradually becomes changed through a dull-brownish yellow to a deep green color, resembling in this respect some samples of Cape aloes, which it more nearly approaches in chemical and microscopical character. It differs from Cape aloes, however, in its color and opacity, from Natal aloes in not giving a crimson color with nitric acid, and from hepatic aloes in not presenting numerous minute masses of crystals when examined in water or alcohol.—Pharm. Journ., March 11, 1899, 230.

Uganda Aloes—Chemical Examination and Comparison.—Confining their work to the chemical examination of Uganda aloes supplied in bricks and in chips, W. A. H. Naylor and J. J. Bryant have obtained results which are identical with each other, and compared them with the results of a recent chemical examination of a good average sample of Cape aloes. The results are shown in the following table:

Sample.	Percentage of Aloin.	Aqueous Extractive. Per cent.	Inorganic Matter. Per cent.	Moistened with HNO_3 on a white Tile.	Bromine Product.	General Description.
Uganda	Chips: 6.16 Brick: 5.90	80.03	0.919	First crimson red, gradually becoming brown, and finally green.	In yellow crystalline plates, readily soluble in 90 per cent. alcohol.	A reddish-brown color, with a chippy rather than resinous fracture, a pronounced aromatic odor, and a very bitter taste.
Cape	6.5	85.44	0.505	First crimson red, gradually becoming brown, and finally green.	Yellow and granular, not crystalline, readily soluble in 90 per cent. alcohol.	A deep reddish-brown color, with a greenish tinge, a glassy fracture, an odor less aromatic than Uganda, and a bitter taste.

Uganda aloes evidently approximates very closely in characters and tests to Cape aloes.—Pharm. Journ., April 1, 1899, 296.

Curaçoa Aloes—Causes of Indifferent Quality.—Brit. Consul Jesburun, reporting on the trade and commerce of Curaçoa and its dependencies for the year 1898, states that New York is the only market where anything near the cost price of manufacturing could be obtained for the indifferent kind of aloes produced in these Dutch possessions. Aruba, Bonaire and Curaçoa could produce very clean and high grade aloes were the price for such quality any better than that at present obtainable on foreign markets, where buyers are said to give preference to the dirty or low grades on account of cheapness, and because those who handle the aloes in Europe are able to obtain the exact grade desired, produced by suitable machinery and process, at a far less cost than is possible on these islands. Moreover, the higher duties levied by the Netherlands Government are to some extent responsible for these unsatisfactory conditions.—Pharm. Journ., June 10, 1899, 538.

Aloes—Review of the Chemistry.—Alfred R. L. Dohme reviews the chemistry of aloes, and in this connection particularly the valuable researches of Tschirch and his pupils, made during the last four or five years, which have brought out the following points: (1) That Curaçoa aloes is as efficient, and being much cheaper, should be used in preference to Socotrine aloes, the greater portion of which as sold to-day is made up anyway of Curaçoa aloes. (2) That the resin of aloes is an ester or organic salt, and varies according to the kind of aloes, and that the varying constituent is the acid, the alcoholic constituent being aloresinotannol and being the same in both Barbadoes and Cape aloes, the only two thus far examined. (3) That aloin contains *emodin*, to which its laxative property is probably due. (4) That many laxative drugs, such as senna, cascara sagrada, rhubarb, buckthorn bark, besides aloes, owe their laxative property to this substance, emodin, or some substance like it, derived from *anthraquinone*, and homologous or isomeric with it. To show the

exact relations of anthraquinone to these well-known laxatives, further researches are necessary and are now in progress.—Proc. Maryland Pharm. Assoc., 1898, 99–102.

IRIDACEÆ.

Saffron—Microscopic and Chemical Distinctions from Carthamus and Calendula.—Henry Kraemer briefly reviews the literature on the subject of saffron and its adulterants. In this country two substances can be purchased under the name of saffron, the one being the stigmas with some styles and also fragments of anthers and perianth of *crocus sativus*, L., the other the tubular and perfect flowers of *carthamus tinctorius*, L. Either or both of these are also subject to adulteration or substitution by the florets of *calendula officinalis*, L., while the very much more expensive *crocus* is often substituted by the inexpensive *carthamus* flowers, generally known by the name of American saffron. Prof. Kraemer, after describing the microscopical characters by which these several products may be distinguished from each other, recommends the following chemical test, which is based upon the sulphuric acid test, probably first utilized by Joh. Müller (1844). The test may be made on a microscopic slide or in a watch crystal or test tube, but the greatest care must be exercised that the glass is clean and the sulphuric acid concentrated and chemically pure. The acid is added to the substance, when the following characteristic color reactions will manifest themselves:

Crocus: The stigmas only become blue immediately, and in a half-minute the solution becomes blue, gradually changing to a violet, and finally a deep wine-red color.

Carthamus: The flowers turn yellow and the solution remains colorless for several minutes. The latter changes to yellow, and finally, after a much longer time, however, assumes a color similar to crocus, viz., a deep wine-red color.

Calendula: The flowers turn brown or blackish-brown, as though charred. The solution behaves otherwise, much the same as carthamus.

The author thinks that the pharmacopœial tests for saffron might be improved by adding the microscopial as well as chemical tests of distinction.—Proc. Penna. Pharm. Assoc., 1898, 100–104.

Saffron—Practical Method of Determining Tinctorial Value.—The value of saffron depending on its tinctorial power, Edwin Dowzard recommends the following quick and practical method for estimating the amount of crocin in a sample. A standard solution of chromic acid is prepared containing 78.7 Gm. of chromic acid. A solution of 0.15 Gm. of crude crocin in 100 Cc. of water is equal in tinctorial power to the same volume of this standard solution. To carry out the test, the sample is reduced to coarse powder, 0.2 Gm. of the powder is placed in a stoppered cylinder having a capacity of about 35 Cc., 20 Cc. of 50 per cent. alcohol are

added, and the lightly stoppered cylinder is placed in water at 50° C. for 2½ hours. The cooled solution is filtered, and 10 Cc. of the filtrate, representing 0.1 Gm. saffron, are diluted with water to 50 Cc. This diluted solution is then compared in depth of color with 50 Cc. of the standard chromic acid solution, the comparison being made in two Nessler glasses of equal bore. If the chromic acid solution is deeper in tint than the solution under comparison, small quantities are removed until equilibrium is produced, and *vice versa;* the solutions are then measured, and the amount of crude crocin calculated. Crude crocin is understood to be the product obtained by extracting saffron with ether, drying the residue, exhausting it with 50 per cent. alcohol, and evaporating the alcoholic solution to dryness.—Pharm. Journ., Oct. 22, 1898, 443.

Saffron—Moisture and Ash in Commercial Samples.—W. Newton Brazier has examined eleven samples of saffron obtained from various sources, with results shown in the table. The samples from No. 1 to 5 were obtained from reputable London houses, while those from 6 to 11 are direct from French growers.

No.	Moisture.	Ash.	Ash on Dried Sample.
1	16.84	16.8	20.2 [Potassium chloride.]
2	13.04	3.88	4.3
3	15.24	4.18	4.8
4	14.36	10.04	11.7 [Potassium chloride and nitrate.]
5	15.24	18.28	21.5 [Potassium sulphate.]
6	13.44	3.76	4.3
7	13.12	3.92	4.5
8	13.04	3.20	3.6
9	12.48	3.62	4.0
10	12.56	3.64	4.1
11	13.92	3.16	3.6

These results seem to point out that many good samples of commercial saffron exceed the British Pharmacopœia limit for moisture, and that it might be advantageous to adopt the U. S. Pharm. standard of 14 per cent. loss when dried at 100° C. On the other hand, it is evident that a good sample of saffron should yield very much less than the British Pharmacopœia maximum of 7 per cent. of ash calculated on the dried article, and, therefore, the standard might conveniently be made more stringent —say, "Dried saffron generally yields between 3 and 5 per cent. of ash, and should not yield more than 7 per cent." In view also of the nature of the excessive mineral matter, the British Pharmacopœia test might be extended somewhat to the following effect: When a small portion is placed in a glass of warm water it colors the liquid orange-yellow, becomes itself paler in color, and does not deposit any white or colored powder, *nor does this infusion acidulated with nitric acid yield any precipitate with*

solution of barium nitrate or silver nitrate. The words in italics are the additions which should be made.—Chem. & Drugg,, May 20, 1899, 815.

Saffron—A New Adulterant.—J. Wauters has observed that saffron is largely adulterated with a coal-tar derivative made by a German firm, and that this derivative closely imitates the color of the genuine drug. This derivative appears to be itself adulterated with sodium chloride to the amount of 75 per cent., the presence of which thus affords a means of detecting the adulteration. In the assay of saffron, the proportion of genuine drug may be estimated by the amount of crocetin present, and the added coloring matter by noting the amount of sodium chloride. The coloring matter is apparently introduced by the addition of the feminelæ of a species of marigold colored with it. These are recognized under the microscope. A good test for the presence of the foreign coloring matter consists in trying the tinctorial power of a sample on wool, silk or cotton. These assume a lemon-yellow with a solution of the true drug containing tartaric acid, which is not altered by subsequent treatment with potassium hydroxide, while under this treatment the fabrics dyed with the adulterated saffron assume in each case a deeper color.—Pharm. Journ., Aug. 27, 1898, 241.

AMOMEACEÆ.

Amomum Angustifolium—Habitat, Description and Uses.—J. Mahow, writing from Zomba, states that the "Korarima Cardamom" (*Amomum angustifolium*) is a widely distributed plant in tropical Africa, and that he found it fairly common by the side of streams and in moist gullies. The Yaos call the plant "Tambali," or "Tambala." It flowers in November and the seeds possess a spicy flavor. The natives eat the ripe fruit raw occasionally and are believed to use the seeds as a flavoring agent. It is a handsome and striking plant, often attaining a height of fifteen feet; produces dense compact clusteers of tawny orange-colored flowers with some rose-colored markings, and brilliant, shining scarlet fruits, which are often in clusters of three. The leaves and roots possess slight aromatic properties.—Pharm. Journ., Oct. 1, 1898, 370; from Kew. Bulletin, 142, 288.

Ginger—Commercial Analysis.—E. G. Clayton has examined thirty-seven samples of commercial ginger, including the following varieties: Jamaica, Cochin, Bengal, Japan and Africa, in various conditions—whole, ground, washed, unwashed, spent, scraped and cut—with the purpose of determining the following points: (1) the presence of spent ginger in the samples; (2) the effect of the washing process on the substance of the ginger; (3) the influence of the grinding process, with the removal of the fibre, as well as the effect of the cutting and scraping of the rhizome; (4) comparison of samples of different geographical origin; and (5) comparison of the figures yielded by different market qualities (as indi-

cated by price) of the same variety of ginger. The analyses included the determination of the ash—soluble and insoluble; the extracts dissolved by cold water, ether, absolute alcohol and petroleum spirit; the essential oil, etc., etc.; the tables published by the author bringing out these and many other points of interest, from which the following general observations are deduced: (1) In determining the moisture many samples after prolonged drying began to gain weight, owing probably to oxidation. (2) The effect of washing is to diminish the percentages of some of the constituents, such as the ash, soluble ash, and cold aqueous extract. (3) A similar influence appears to be exerted by grinding, removal of fibre and the operation of cutting and scraping of the rhizome. While the combined effect of all these processes does not so reduce the ginger as to make it approximate to the spent ginger, it is noteworthy that an examination af four different market qualities of Cochin ginger lead to the remarkable conclusion that the proportion of principal constituents diminishes as the price increases. This naturally leads up to the question whether quality is not sometimes sacrificed for appearance.—Analyst, *24*, 122.

Alpinia Malaccensis, Rosc.—Yield and Character of Volatile Oil.—Dr. van Romburgh, of the Botonical Garden at Buitenzorg, Java, reports on the yield and character of the volatile oil obtained by distilling the rhizomes of *alpinia malaccencis*, Rosc., a plant growing wild in the neighborhood of Buitenzorg, and called "Ladjah goah." The yield is about 0.25 per cent. of a colorless oil, having a disagreeable odor (that of methyl cinnamate with a slight by-odor recalling that of borneol is described in a sample of the oil which has reached Europe). Its specific gravity is 1.039 to 1.047 at 27° C., it solidifies almost entirely on slight refrigeration, and it is slightly dextrogyrate. The solid component is a methyl ester of cinnamic acid—in this case met with for the first time in an essential oil. The leaves of the plant also yield an oil rich in methyl cinnamate.—Schimmel's Report, April, 1899, 63.

ORCHIDACEÆ.

Vanilla—Collection and Process of Curing.— The "Tropenpflanzer" (ii., 1898, No. 11), describes the simple and reliable method practiced in Teysmannia for curing vanilla. The fruits are not collected until the extreme point has become black. If during drying the point shows a tendency to split, its progress is prevented by winding a thin wire around it. The fruits are spread out in flat baskets and exposed during the morning sun for one day. They are then transformed to a flannel bag, provided with numerous divisions each holding a small number of the fruits, and these are then exposed to the wind until they have become uniformly black. They are next tied into bundles, then are enveloped in flannel, and the drying is completed in the shade. Finally, they are stored, in

bundles of 100, in well-corked bottles. It is of paramount importance that the fruit should be collected in the proper condition for ripening.—Apoth. Ztg., Dec. 17, 1898, 879.

Vanilla—Cultivation in German East Africa.—Dr. H. Busse has contributed in Vol. XV. of the Reports of the German Imperial Health Office an exhaustive monograph on vanilla, a comprehensive abstract of which is printed in "Apoth. Ztg." (Dec. 24, 1898, 894), concerning the cultivation of vanilla in the German East African colonies. The author observes that these colonies without a doubt present all the conditions necessary to the successful and profitable cultivation of the plant. Indeed, the product of these colonies already rivals the best sorts of Bourbon vanilla, and it is therefore confidently expected that at no distant time the vanilla for "home" consumption will be exclusively supplied from the colonies under the protectorate of Germany. With regard to the collection and curing of vanilla, the author considers two typical processes as being available, namely, the Mexican or "dry method," and the "hot water method." According to the "dry method," the fruits are cut as soon as they have turned yellow, and placed on wooden trays upon which they are allowed to wilt and drain during 24 hours. They are then assorted and exposed upon woolen cloths to the sun during a day, whereupon, while still hot, they are placed into boxes lined with flannel and allowed to sweat during 16 to 22 hours. Next day the pods are again exposed to the sun, or simply to the air and protected from the sun, so that they may become dry, and they are alternately dried and allowed to sweat during 20 to 30 days, the sweating process, however, being only 4 to 5 times. In case of continued unfavorable weather, the drying is conducted with the aid of a drying oven. When the vanilla has become coated with a crystalline efflorescence, the curing is ended; the pods are tied in bundles of 50, and enclosed in tins. The "hot water method" consists in dipping the pods as soon as they are cut from the plant into boiling water, and then suspending them so that they may be freely exposed to the sun during several hours. On the following day the pods are coated with oil, wrapped in cotton to prevent them from splitting, and they remain suspended until the exudation of a balsamic fluid ceases, this being facilitated by occasional gentle pressure with the figners. The now furrowed, brown, half-dried pods are again oiled, and preserved in earthen jars. After describing the different commercial sorts of vanilla, which, when genuine, are all derived from *vanilla planifolia*, the author observes that while "Mexican vanilla" is generally regarded as being the best, this rarely reaches the European market, which is supplied almost exclusively with "Bourbon vanilla," from Reunion. The so-called "vanillons" of commerce are in part derived from certain other species of *vanilla*—V. pompona, V. guianensis, etc.—and part from undetermined sources. These "vanillons" contain besides vanillin also piperonal, which doubtless

modifies their flavor. With regard to the chemistry of vanilla, the author observes that it is a remarkable fact that vanillin is present in the living fruit only in insignificant quantities, and that it is mainly produced in the process of curing. He does not, however, consider the vanillin to be the sole criterion of quality, and maintains that vanillin alone does not represent the natural aroma of the drug. Its determination is effected by shaking an ether-extraction of the vanilla with aqueous solution of sodium bisulphite, decomposition of the compound of vanillin and bisulphite by sulphuric acid, expulsion of the sulphurous acid by heat, and shaking out of the residual aqueous fluid with ether, which leaves the pure vanillin on evaporation. In the presence of piperonal, advantage is taken of the property of vanillin to form salt-like compounds with bases. Besides piperonal, Dr. Busse has found a second aldehyde which is peculiar to vanilla. Besides the vanillin, the drug also contains vanillic acid; the other constituents—fat, resin, sugar, mucilage, tannin, etc.—are of no importance. The "Monograph" in the Report initially referred to embraces 113 pages, and is embellished with numerous plates and illustrations.

LAURACEÆ.

Laurus Sassafras—History—Prof. John Uri Lloyd has written an interesting historical account of laurus sassafras from its first introduction into European notice to the present time. The paper embodies the pharmacological, chemical and medicinal, as well as the commercial uses to which this valuable American plant is applied, and is followed by an extensive bibliography referring to its history.—Pharm. Review, Dec., 1899, 450–459.

Sassafras—Chemistry of the Components of the Plant.—Dr. Kleber read an interesting paper on the chemistry of sassafras, at a recent meeting of the College of Pharmacy of the City of New York, in which he deals mainly with the volatile oils obtainable from the root and from the leaves. Besides these, the various parts of the plant contain little that is interesting, unless it be the seed matter, termed "sassafrid," which is formed in fresh sassafras roots when exposed to the air, and which seems to be an oxidation product of some tannin-like matter in the plant. The well-known article of commerce that is called simply

Oil of Sassafras is distilled exclusively from the roots, and chiefly from the bark of the root, though a little oil of apparently the same composition is obtainable from the wood—less than 1 per cent., while the root bark contains from 6 to 9 per cent. The oil of sassafras bark, when fresh distilled, is almost colorless, but when exposed to light and air it gradually assumes a yellow, reddish and even brown color. Its sp. gr. is between 1.07 and 1.08, its optical rotation to the right, varying from $+3^{\circ}$ to $+4^{\circ}$, the rotation being lower as the sp. gr. rises. Owing to the liability of its principal constituent, safrol, to separate out partly during cold weather,

frequent controversies occur between distiller and buyer owing to variations in the observed specific gravity. Safrol has a sp. gr. as high as 1.108, and a separation of any considerable portion of it necessarily makes a difference in the sp. gr. of the remainder. The container should therefore always be shaken during cold weather before drawing off the oil. The author summarizes the composition of oil of sassafras bark as follows: safrol, $C_{10}H_{10}O_2$, 80 per cent.; pinene and phellandrene, $C_{10}H_{16}$, 10 per cent.; d camphor, $C_{10}H_{16}O$, 6.8 per cent.; eugenol, $C_{10}H_{12}O_2$, 0.5 per cent.; cadinene (?), $C_{15}H_{24}$, and residue, 2.7 per cent. Oil of sassafras bark in its qualitative chemical composition closely resembles oil of camphor. This similarity in composition has been taken advantage of by chemical manufacturers in produceing substitutes for oil of sassafras from oily by-products of the manufacture of camphor, with the result that certain fractions of Japanese camphor oil, of about the sp. gr. 1.07, are placed upon the market as substitutes for the true oil, and, being cheap, are used largely in the industries.

Oil of Sassafras Leaves is not known in commerce. It is present in fresh leaves to the amount of only 0.028 per cent. of their weight. It is, when fresh, greenish-yellow, turning reddish-brown with age, has the sp. gr. 0.873, opt. rot. +6° 25′, and a very agreeable odor somewhat resembling oil of lemon and oil of citronella; this odor being due to the presence of the same bodies as are contained in citronella and lemon oil, viz., citrol and geraniol. It contains also several terpenes, pinene and phellandrene, and a considerable amount of hydrocarbon, $C_{10}H_{16}$, belonging to the "alipathic terpenes."—Amer. Journ. Phar., Jan. 1899, 27–32.

MYRISTICACEÆ.

Myristicaceæ—Structural Characteristics.—In an elaborate monograph of the *Myristicaceæ*, O. Warburg gives the following structural characteristics of the plants belonging to this order: They are characterized by sacs containing a reddish astringent kino, which becomes blood-red on exposure to the air. The hairs are very characteristic, being always branched sympodially. Oil-cells containing an essential oil are invariably present. The aril originates before the flower opens and before fertilization. It is at first nothing but a thickening of the integument in the region of the hilum, the exostome taking part in its formation. It contains in its cells an essential oil, a resinous substance, crystals of calcium oxalate, and in many species also a substance intermediate betwgen dextrin and starch. All the species of the *myristicaceæ* appear to be cross-pollinated by the agency of insects.—Pharm. Jour., July 30, 1898, 97; from Nova Acta Acad. Caes. Leopold Carol., LXVIII, 1–680.

Mace—Percentage of Fixed Oil.—No mention of the amount of fixed oil in mace being made in the usual works of reference, Messrs. Schimmel & Co. have noted the yield obtained in process of manufacture. They

obtained from 100 kilos of mace 12 kilos of crude oil, which was composed of 68.8 per cent. of fixed oil and 6.3 per cent. of alcohol, the remaining 24.9 per cent. being calculated as volatile oil. Upon this basis they find mace to contain 8.25 per cent. of fixed oil, congealing at 11° C.—Phar. Ztg., Nov. 5, 1898, 793.

POLYGONACEÆ.

Rhubarb—Similarity of its Glucosidal Constituents with those of Frangula Bark. — By treating rhubarb precisely like frangula bark (which see), Amweg has also obtained two glucosidal groups—"primary" and "secondary"—which apparently yield the same products of hydrolysis as do the corresponding groups obtained from frangula bark. In an examination of ten different commercial samples of rhubarb it developed that the absolute quantities of the mixed glucosides varied greatly on the one hand, while on the other, the relative proportions of the primary and secondary glucosides fluctuate widely in the samples. So Shensi rhubarb, for instance, contained 40 per cent. of the readily soluble or primary glucoside, and 5 per cent. of the sparingly soluble or secondary glucoside, while rhapontic rhubarb contained 37 per cent. of the latter, and only 25 per cent. of the primary glucoside.—Pharm. Centralh., Oct. 27, 1898, 777.

PRIMULACEÆ.

Primula obconica, Hance—A Poisonous Chinese Species.—Dr. Th. Husemann directs attention to a poisonous species of *primula, P. obconica,* Hance, a plant which was first described by Hance in 1880 from specimens collected by T. Walters near Ichang, in the Chinese province of Hupeh. The poisonous effect upon the skin of persons handling the plant was first noticed by English writers in 1889, and experience has since placed it beyond a doubt that when the plant is brought in contact with the skin it produces exanthemous eruptions, which from the fingers and hands gradually may be transferred to other parts of the body. The poison first manifests itself several hours after contact by severe itching, which continues after the eruption has formed. It does not, however, manifest itself alike on all persons, producing in some cases erythematous eruptions, in others violent eczema, while in some cases both forms may manifest themselves upon the same person. No antidote to this poisonous action of the plant has yet been determined. The most rational treatment consists in removal of the poison by means of soap and brushing.—Apoth. Ztg., July 16, 1898, 496 ; from Wien. Med. Bl., 1898, 407.

SCROPHULARIACEÆ.

Digitalis—Review of the Chemistry.—A. R. L. Dohme reviews the chemistry of digitalis, particularly in the light of the results during the last few years of C. C. Keller, who has shown that the various digitalins of

literature and commerce are more or less impure forms of the real active principle of digitalis, namely "digitoxin." Whether or not there are other active principles besides this remains an open question, but it has been established that digitoxin is the most active. The so-called Keller's test for digitoxin is characteristic, and distinguishes it sharply from digitalin. Mr. Dohme's paper may be consulted in Proc. Maryland Pharm. Assoc., 1898,85–87.

Digitalis—Practical Identity of the (Active) Components of the Leaves and Seeds.—In contradiction of the observation of Kiliani made some years ago that the leaves of digitalis did not contain the same (active) components as the seeds of that plant, M. Cloetta now maintains that there is no essential difference in their qualitative composition. The constituents of the leaves, digitonin, digitalin, digitoxin, and the coloring matter are identical with those occurring in the seeds. The only difference that may be mentioned is the presence of digitalein in the seeds, but its occurrence in the leaves is not excluded, possibly by reason of the difficulty to separate small quantities that may be present from digitoxin and digitalin. It is true that the relative proportions of these constituents differ in the leaves and seeds, digitalin predominating in the seeds, whilst digitoxin is the larger constituent of the leaves. This explains the assertion frequently made that *digitalinum verum* cannot replace a freshly prepared infusion of the leaves, since digitoxin, the predominating constituent of the leaves, is about five times as effective as digitalin. On the other hand, a corresponding amount of digitoxin should, on theoretic grounds, produce the same therapeutic effect as an infusion of digitalis. In this connection the author calls attention to the remarkable fact that the very easily soluble digitonin has the property of promoting the solution of the digitoxin which is insoluble in water under ordinary conditions. In the presence of digitonin it becomes soluble in water, to what extent is not stated.—Apoth. Ztg., April 5, 1899, 178; from Arch f. Exp. Pathol. u. Pharmacol., 1898, 425.

Digitalis—Administration in Large Doses in Cases of Pneumonia.—Dr Albert Frankel has administered with good results in cases of pneumonia doses of digitalis up to 4 Gm. per day in form of infusion. The total amount of digitalis consumed during 3 or 4 days, however, did not exceed 10 to 12, at the highest 14 Gm. The only unpleasant after-effects which were noticed in a number of cases, were nausea and emesis; but this occurred only in cases of patients having cardiac affections. On applying the remedy per rectum, these effects were prevented. In cases of pronounced heart-trouble the use of large doses of digitalis is excluded.—Therap. d. Gegenw., 1899, 18; Apoth. Ztg., Feb. 18, 1899, 90.

SOLANACEÆ.

Chilian Solanums—Isolation and Identification of Solanine as Alkaloidal

Constituent.—F. Ramdohr and Dr. F. W. Neger, of Concepcion, Chili, have made a chemical examination of several species of *solanum*, namely *S. crispum*, Ruiz et Pav., *S. gayanum*, Remy, and *S. tomatillo*, Remy, which enjoy great popularity in Chili as a domestic remedy under the general name of "Natri." The drug appears to have been the subject of chemical examination by Chilian chemists and pharmacologists at different times, and an alkaloid has been isolated to which the name "Natrine" has been given—probably first by Vasquez, in 1864. Under this name, also, the active constituent of *solanum gayanum* was described in 1892. The conflicting statements concerning the character of this constituent have induced the authors to isolate the alkaloid from the three species of solanum named, and they now identify it to be pure and simple solanine, with which it agrees in melting point (230° to 235°), solubilities, chemical reactions, crystallinity, and also in its ultimate composition, in so far as this could be calculated from the percentage (16.54 per cent.) of gold in the double salt ($C_{42}H_{87}NO_{15}.HClAuCl_3$). The authors furthermore observe that "Natri" has been used from ancient times as an effective remedy in allaying fever in cases of measles, scarlet fever, small pox, etc, the remedy being administered in the form of infusion of the leaves and stems. —Pharm. Centralh., July 21, 1898, 521–523.

Belladonna Leaves and Preparations—Modification of Keller's Assay Process.—Frank X. Moerk has made a careful study of the process of C. C. Keller's method of alkaloidal assay as applied to belladonna leaves and their preparations, having the determination of the alkaloidal strength of belladonna plaster, U. S. Pharm., 1890, particularly in view. He procured three commercial varieties of belladonna leaves, viz. English cultivated (Allen's), German cultivated, and German wild (a careful examination and description of which is given by Prof. Henry Kraemer), and prepared from these several sorts the official extract, and from this, in turn, the official plaster. In the course of his experiments he encountered certain variations and discrepancies in results, which made it necessary to modify the process, particularly in the manipulation, and in accordance with these observations he recommends the following method and manipulation: Having determined the moisture, in about 2 Gm. of the leaves at 100° C., a small, slightly conical percolator about 8 inches long and 1¼–1½ inches wide, such as are used in certain continuous extraction apparatus, is connected with a piece of rubber tubing (about 12 inches long) having a small piece of glass tubing (about 2 inches long) attached for the purpose of regulating the dripping of the percolate; this can also be regulated by use of a brass spring. A plug of cotton having been placed into the neck, place 20 Gm. of the powdered leaves into the percolator, add 50 Cc. of a mixture of 2 volumes of alcohol and 1 volume of water, and stir with a heavy iron wire until a homogeneous mixture results, and in such manner that the air-bubbles are brought as completely as possible

to the surface; rinse the wire and sides of the percolator with 25 Cc. more of the same menstruum and allow to macerate over night. Percolate until 75 Cc. of percolate are obtained, macerate again for 5 to 6 hours, again percolate 75 Cc., and so alternate until 300 Cc. of menstruum in all have been used. Then evaporate the percolates in a weighed porcelain dish until the resultant extract can no longer be stirred with a glass rod, and ascertain the yield of extract by weighing.

From this point on, the assay of the leaves and of the extract are identical; the extract in the dish, or about 5 Gm. of any other belladonna extract, is disintegrated by using 10 Cc. of acidulated water (2 Cc. H_2SO_4, U. S. P., to make 500 Cc.) and stirring with a glass rod, transfer to a separator, together with the washings (2 Cc. of acidulated water several times) of the dish or beaker, and shake out with three successive portions of 10 Cc. of ether-chloroform mixture (ether 4 parts and chloroform 1 part by weight); then rinse the dish or beaker with sufficient acidulated water to make the total acid solution in the separator up to 25 Cc., add 20 Cc. of the ether-chloroform mixture, agitate thoroughly, and allow the acid solution to run into a beaker. Repeat this with 15, 10 and 5 Cc. of acidulated water, and, having rinsed out the separator, return the acid liquids into it, using the last portion of 5 Cc. to rinse the beaker in which the other three had been collected, using finally 5 Cc. of pure water. Now add 25 Cc. of ether-chloroform mixture, made in the proportion of *one* part of ether to *two* parts of chloroform by weight (and 8 Cc. of 10 per cent ammonia water, Rep.*) and shake out with the customary precautions, using successively 15, 10 and 5 Cc. of the same solvent (ether-chloroform, Rep.), and filtering the solution successively through a small filter into a dry flask of 120 Cc. capacity—finally washing in succession the separator, filter, etc., with small portions of the solvent in order to absolutely transfer all the alkaloid to the flask. From this distill off the solvent in a water-bath, warm until the odor of chloroform disappears, dissolve the residue in 5 Cc. of ether, evaporate, redissolve the residue in 5 Cc. ether, evaporate, and heat until the odor of ether disappears; dissolve in 8 Cc. of neutral alcohol, add 30 Cc. water and 3 drops hæmatoxylin solution and titrate with standardized HCl to the disappearance of any red shade or the formation of a pure yellow color. In these experiments the hydrochloric acid was standardized with pure sodium carbonate, and 1 Cc. was found the equivalent of 0.02104 Gm. mydriatic alkaloids.

One of the difficulties encountered was the persistent emulsion formed during the extraction of the alkaloid from its alkaline solution, this being particularly so in the case of the assay of the plaster. If this should occur during any stage of the shaking out, it may be readily overcome by add-

* In the original text this is omitted, but in another portion of the paper (p. 108) the quantity of ammonia water is given as here=8 Cc.—Rep.

ing a fragment of *stearic acid*, and manipulating as follows: A small quantity of stearic acid, weighing 10 to 15 milligrams, or even less in many cases, is added in small fragments, and vigorously shaken with an emulsified mixture. On then allowing it to stand for a few minutes, separation will begin, or can be made to begin by a *twirling* motion imparted to the stem of the separator; the clear portion may then be run off, and the same coaxing, twirling motion repeated, the clear liquid again drawn off, and so on until all has been separated. It may happen that a little more stearic acid may have to be added after the first extraction. In this way it was found possible to complete, in about two hours, the several extractions in the assay of a plaster, the first extraction of which had remained emulsified for two days. The presence of stearic acid (other fat acid probably also answering, though not tried) does not interfere with the final titration of the alkaloid. In the assay of belladonna plaster, the alkaloid is brought into acid solution by decomposing the soap and lead salts with sulphuric acid, the calculated quantity being 1 Cc. sulphuric acid, U. S. Pharm., 15 Cc. of water and 10 Gm. of the official plaster. The mixture is heated until complete decomposition of the soap and salts is effected, and is then washed out by decantation and filtration with several portions of 10 Cc. of acidulated water, and this shaken out in the manner before explained, with ether-chloroform, etc. The author's results with the several kinds of belladonna leaves, and the extracts and the plasters prepared from them, are given in two tables, *a* and *b*, which may be consulted in the original. The following summary, however, may find place here:

Variety.	Leaves.			Extract.
	Moisture. per cent.	Extract. per cent.	Alkaloid. per cent.	Alkaloid. per cent.
English, cultivated (Allen's)	8.40	*a.* 33.55	*a.* 0.5996	*a.* 1.8510
		b. 32.55	*b.* 0.6054	*b.* 1.8280
German, cultivated	7.60	*a.* 36.55	*a.* 0.5155	*a.* 1.5980
		b. 36.30	*b.* 0.5050	*b.* 1.5850
German, wild	6.80	*a.* 27.00	*a.* 0.4997	*a.* 1.6998
		b. 27.45	*b.* 0.4997	*b.* 1.7133

The results from table *b* were obtained by the author's improved method of manipulation.—Amer. Jour. Pharm., March, 1899, 105–120.

Belladonna Leaves—Variability in Alkaloidal Content.—W. A. Puckner has assayed 19 samples of belladonna leaves taken by original bales and offered in response to a request for the best quality of drugs and with the understanding that the purchase would depend upon the result of assay. The assays were made according to a modification of Keller's process, recommended by the author in 1898, (see Proceedings, 1898, 798), with results as follows: 0.46, 0.51, 0.24, 0.42, 0.38, 0.01, 0.16, 0.28, 0.34, 0.02,

0.18, 0.03, 0.13, 0.26, 0.34, 0.52, 0.50, 0.48, 0.51 per cent. of alkaloid. These results, as well as those of other experimenters cited by the author, show the necessity of the official requirement of a definite alkaloidal content within certain limits in belladonna leaves. Provisionally, the author proposes from 0.35 to 0.40 per cent., and that any belladonna leaf of a higher percentage may be brought within these limits by admixture of belladonna leaf of lower percentage.—Pharm. Review, Sept. 1898, 324–328.

Hyoscyamus Muticus.—Hyoscyamine the Sole Alkaloid.—Wyndham R. Dunston and Harold Brown, assisted by Mr. Andrews, have extracted the alkaloid from a sample of *hyoscyamus muticus* furnished by the Indian Government, and found the whole of it to consist of hyoscyamine, whereas the alkaloid obtained under the same process and conditions from *H. niger* was mixed with varying proportions of atropine and scopolamine. This Indian species of *hyoscyamus* abounds in the Punjaub, Beloochistan, Afghanistan and elsewhere, and is extensively used externally in Indian medical practice. On account of its powerful excitant properties, by virtue of which mania may be produced, it has also received the name *hyoscyamus insanus*. According to Dr. Praed, of the Botanical Survey of India, the intoxicant known as "blang," so largely used throughout India and Persia, is not prepared so exclusively from *cannabis indica* as has been imagined, but, especially in Persia, from species of *hyoscyamus*. It appears, also, that in Beloochistan the *hyoscyamus muticus* alone is employed in making both this preparation and the well-known "hashish."—Pharm. Jour., Dec. 10, 1898, 625.

Tobacco—Percentage of Nicotine in Manufactured Products.—H. Sinnbold has determined the nicotine in a large number of different brands of smoking tobacco, cigars and cigarettes. He finds the methods employed, that of Kissling and that of Popovici, to give satisfactory and concordant results, the method of Kissling being titrimetric while that of Popovici, used for the purpose of control, is a polarimetric method. Eight representative samples of smoking tobacco were examined, and yielded in seven samples from 0.518 to 0.726 per cent. of nicotine. The eighth sample, which was recommended as light, both in color and strength, contained 1.854 per cent. of nicotine. Thirty-one samples of cigars were examined. The minimum yield of nicotine, 0.972 per cent., was found in a very dark imported "Upmann," which was designated as particularly "strong;" the maximum was found in an Austrian brand, designated as "Regie-Virginia." In this case the yield of nicotine was 2.975 per cent., probably due to the use of "Virginia tobacco," which is known to contain a very high percentage of nicotine (according to Kissling in two samples 4.8 and 4.3 per cent.). The more expensive imported Havana cigars yielded a maximum of 2.241 per cent. and a minimum of 1.633 per cent. of nicotine. Cigarettes examined by the author yielded from 0.801 to 2.887 per cent. of nicotine. It seems probable from these results that the

so-called "strength" of tobaccos, cigars, and cigarettes, is not so much dependent upon the amount of nicotine they contain as upon the character of the products of fermentation formed during the curing of the tobacco. Suchsland has already pointed out that the aroma of tobacco depends largely upon the activity of the fungi concerned in the process of fermentation to which tobacco is subjected.—Arch. d. Pharm. (1898) *236*, No. 7, 522–529.

Capsicum—Microscopical Study.—W. F. Leech and L. E. Sayre have made a microscopical study of capsicum with the view to distinguishing between commercial varieties and to detect adulterants. The authors quote extensively from reports of the Department of Agriculture, and conclude their paper with the results of an analysis of pure Zanzibar capsicum, as given in the report named.—Proc. Kansas Pharm. Assoc., 1898, 27–29.

Egg Plants—Proximate Examination of the Fruits.—A. Zega, calling attention to the use of the fruits of

Solanum melongea, L., as a popular food, gives the results of their proximate examination, as follows: Water, 92.27 per cent.; proteins, 1.51 per cent.; fat, 0.085 per cent.; carbohydrates, 4.52 per cent.; fibre, 0.698 per cent.; ash, 0.698 per cent. The juice amounts to 96.09 per cent. of the fruit. The dry residue of evaporation contains 19.83 per cent. of nitrogenous bodies and 58.47 per cent. of carbohydrates. The coloring matter of the fruits, which have a deep blue-violet color, may be extracted from the rind by means of alcohol containing hydrochloric acid. Obtained in this way it has a handsome carmine-red color; when carefully treated with alkali, the solution turns violet at first, then deep blue, blue-green, finally green, and disappears with a large excess of alkali.—Chem. Ztg., 1898, No. 92; Apoth. Ztg., March 8, 1899, 121.

OLEACEÆ.

Olives—Method of Preparation for the Table.—Consul Finn communicates the following method employed in Malaga for preparing olives for the table: Soak the olives in a mixture of fresh water and caustic soda. For Manzanilla olives the mixture has a density of 3°, Baumé; for large olives 2½°. The olives are kept for six to nine hours in this mixture, according to the time they are intended to be kept. If they are to be consumed promptly, nine hours; if to be kept some time, six hours. Afterwards they are put in water for twenty-four hours, the water being changed three times during that period. They are then placed in casks floating in a pickle composed of sea salt and water, and having a density of 9°, Baumé. A most essential point in this method is that the water used in all the operations must be the softest and freshest possible.—Pharm, Journ., July 16, 1898, 72.

MYOPORINEÆ

Eremophila Maculata.—An Australian Poisonous Plant.—J. H. Maiden calls attention to the poisonous properties of *eremophila maculata*, F. v. M., when eaten by stock. The natives (blacks) use the leaves, which they call "Wedgerra," as a blister when suffering from cold.—Pharm. Journ., Nov. 12, 1898, 505; from Agric. Gaz. of N. S. Wales.

LABIATÆ.

Peppermint—Cultivation.—G. L. Curry has contributed an interesting paper in which he briefly reviews the facts, statistical and otherwise, concerning the cultivation and trade in peppermint, and the oil distilled from it, as developed in the numerous papers contributed to the pharmaceutical journals in recent years.—Proc. Kentucky Phar. Assoc., 1898, 70–72.

Mentha Canadensis, L.—Pulegone a, Constituent of the Volatile Oil.—Florence M. Gage has examined the volatile oil distilled from two lots of the herb of *mentha canadensis*, L., collected along the shores of Lake Monona, the one in July, 1896, the other in August, 1897. The first oil had a sp. g. 0.927 at 20° shortly after it was distilled; in 1897 this had slightly changed, being 0.9267 at 20°. The sample collected in 1897 had the sp. g. 0.935 at 20°. It turned the plane of polarized light only 16° 11′ to the right, whereas the first sample was right rotatory 20° 26′. The oils contained besides small quantities of thymol and carvacrol, some pulegone. This was determined by a Baeyer's method. By adding amyl nitrite and a trace of hydrochloric acid to the petroleum ether solution of the oil, crystals of nitroso-pulegone melting at 79° were obtained. A control experiment made with oil of pennyroyal yielded like crystals, melting at 81.5°. Crystals of pulegone-oxime were also obtained, corresponding to those obtained from pennyroyal oil.—Pharm. Review, October, 1898, 412–413.

Pycnanthemum Lanceolatum, Pursh.—Pulegone a Constituent of the Volatile Oil.—The volatile oil of *pycnanthemum lanceolatum* has heretofore been obtained and described by H. C. Barker (1893), W. G. Correll (1894–95), and Holdemer (1895). F. W. Alden has now distilled the oil from plants collected near Madison, Wis., during the months of June, July, August and September, 1897. The yield from the green plant varied from 0.29 and .30 per cent. in June and early July, to 0.48 and 0.68 per cent. in late July, August and September, while the dried plant during the latter months yielded 1.80 and 1.91 per cent of oil. With a singleexception they were right rotatory, varying from +5.966° to 11.083°, the exception being a lot distilled from plants collected on July 3, which showed —0.566°. It had been observed by Barker that the volatile oil has a pennyroyal-like odor. The author therefore anticipated the presence of pul-

egone as one of the constituents, and, following the process of Beckmann and Pleissner, he has isolated from several samples of the oil the crystalline oxime of pulegone. The crystals melted at 157°; but after solidification and cooling, the oxime melted at 117° to 118°. Pulegone oxime hydrate, the so-called pulegone oxime of Beckmann and Pleissner, is represented to melt at 156° to 157°, while the melting point of the true oxime, first prepared by Wallach, is given at 118°. It should be mentioned that instead of using alcohol ether as the solvent for the oxime produced by the action of hydroxylamine hydrochloride and sodium bicarbonate upon the pulegone contained in the oil, the authors employed petroleum ether. The importance of this change becomes evident from the fact that two persons previously failed to obtain pulegone oxime from the oil with alcohol and ether as the solvent, while the first attempt with petroleum ether was successful.—Pharm. Review, Oct., 1898, 414–417.

BORRAGINACEÆ.

Borraginaceæ—Alkanin a Constituent of Numerous Plants belonging to this Order.—J. B. S. Norton, of the Missouri Botanical Garden, having his attention drawn to the red stains produced on the heads of sheep feeding in New Mexico upon

Plagiobothrys Arizonicus, Greene, and being furthermore informed that another plant, doubtless also a species of Borraginaceæ, produces the same result on sheep feeding on it in Western Texas, has investigated the matter. He found on examining specimens of the same species, and others of that genus and related genera in the Garden herbarium, that the specimen had stained the paper a violet-purple, something like wine stain, in some cases through as many as five herbarium sheets. Further examination of the herbarium material showed that the coloring matter is abundant enough to stain the herbarium sheets in the following species, chiefly in the roots: *echium vulgare*, *eritrichium glomeratum*, *krynitzkia barbigera* (abundant in leaves), *K. Californica* (slight), *K. maritima*, *K. micrantha*, *K. pterocarya*, *lithospermum multiflorum*, *L. strictum*, *L. spathulatum*, *L. hirsutum*, *L. canescens*, *L. angustifolium* (not abundant), *plagiobothryo canescens* (in leaves), *P. nothofulvus* (in leaves), *P. tenellis*, *P. arizonicus* (abundant in stem and leaves as well as root), *P. Torreyi* (very abundant in some specimens, others with hardly a trace). The coloring matter in these American plants appears to be the same as that derived from

Alkana tinctoria, alkanin, the presence of which in the leaves and roots of the Plagiobothrys is indicated, together with resins and oils, by characteristic reactions obtained by the author and Professor Tammel. It seems probable that some economic use may be made of these American plants. —Amer. Journ. Pharm., July, 1898, 346–348.

Boraginaceæ — Toxic Alkaloidal Constituents Common to Different Species.—Greimer had in a preliminary paper expressed the opinion that

besides *echium vulgare*, *cynoglossum officinale* and *anchusa officinalis* contain an alkaloid, obtainable in a crystalline condition, and having a physiological action similar to that of curare. He now proposes for this alkaloid the name

Cynoglossine, but finds that *symphytum officinale* contains an alkaloid which is very similar to this, both in its chemical relations and in its physiological action, and has named the new alkaloid

Symphyto-Cynoglossine. He finds, furthermore, that cynoglossine is not the sole toxic constituent of the borraginaceae examined by him, but that they contain a second alkaloid, named by him

Consolidine, which similarly to solanine is capable of being hydrolyzed with acids into glucose and an alkaloid, for which he proposes the name

Consolicine. The physiological action of consolidine is similar to that of cynoglossine. That of consolicine is thrice as intense as that of consolidine.—Pharm. Ztg., Nov. 5, 1898, 793.

BIGNONIACEÆ.

Oroxylum Indicum—Proximate Constituents of the Seeds.—D. Hooper has subjected the seeds of *oroxylum indicum*, used successfully in India as a veterinary medicine, to proximate examination with the following results: Moisture, 3.65; oil, 20.34; resin and bitter principle, 12.96; mucilage and albumen, 20.54; fibre, 32.71; ash, 9.80 per cent. The oil was green in color, bitter in taste, and fluid at 70° (? Rep.) The bitterness is due to a principle found also in the alcoholic extract of the seeds, which had a distinctly crystalline appearance. This principle was insoluble in water, and gave a peculiar reaction with caustic alkalies in that it assumed a red color, passing into green on exposure to the air. This yellow substance is doubtless identical with

Oroxylin, the principle detected in the bark of the tree by Messrs. Naylor and Chaplin in 1890 (see Proceedings, 1891, 394). The seeds are described as thinly discoid, flat, and very light buff colored. They are winged and translucent (hyaline) all round except at the base, and the largest measure 3 inches by 1½ inches. When powdered they have a yellowish color and a peculiar rancid or oily odor, and a bitter and acrid taste. They are known as "damree" seeds, "damree" being also the name of the disease of cattle for which they are held to be the only cure. The disease is a malady that partakes of the nature of ringworm, but proves to be quite fatal.—Pharm. Journ., Oct. 8, 1898, 390; from Agricult. Ledger (India) No. 6, 1898.

CONVOLVULACEÆ.

Fabiana Imbricata — Proximate Constituents.—Dr. Hermann Kunz-Krause communicates the details of an exhaustive study of the chemical constituents of pichi—*fabiana imbricata*, the results of which may be

briefly summed up as follows: *Fabiana imbricata* contains no alkaloid other than *choline*, which is present both in the wood and leaves. It contains, however, a number of characteristic non-nitrogenous bodies, viz.: (*a*) Fabianol; (*b*) fabiana-resin, an oxidation product of fabianol; (*c*) fabiana-glycotannoid; (*d*) oxycumarol and (*e*) methoxycumarol (chrysatropic acid) both products of the hydrolysis of fabiana-glycotannoid, as is (*f*), an uncrystallizable reducing sugar; and (*g*) a characteristic soft resin, which the author regards as the parent substance of all the foregoing. The leaves of *fabiana imbricata* contains much magnesium phosphate.—Arch. d. Pharm. (1898), *236*, No. 6, 1–35.

Jalap—Analysis of an Old Sample.—C. Edward Sage has had opportunity of examining a sample of jalap taken from a lot which had been lying in the Crutched Friars' warehouse for the last twenty-eight years. It consisted of slices of the tuber; all the pieces were hard, dry and brittle, one piece only being a little worm-eaten. This fact is worth noticing, because it has been stated that old jalap is richer in resin than the newer drug, because it is worm-eaten, and the insects only destroy the fibrous and woody portion of the drug. The determinations of the proportion of resin and ether-soluble resin resulted as follows:

	Per cent.
Insoluble in ether	10.49
Soluble in ether	.85
Total resin	11.34

showing that of the total resin only 7.5 per cent. was soluble in ether. From these figures it will be seen that jalap of twenty-eight years ago was not invariably much richer than at present, and it will serve to emphasize the fact that the active ingredient of the drug was liable to variation in those days, as at present.—Chem. & Drug., May 20, 1899, 815.

Scammony—Adulteration with Lead Sulphide.—The "Petit. Monit. de la Pharm.," (1899, 3208), calls attention to a curious adulteration of scammony. The sample was characterized by being covered with small cavities containing small gray and black-blue crystals of a metallic appearance. Ether extracted only 41.3 per cent. of resin, whereas good scammony should yield from 75 to 80 per cent. The ash amounted to 16.6 per cent.; good scammony yields only 3 or, at most, 8 per cent. The insoluble residue contains much starch, and considerable quantities of lead sulphide.—Apoth. Ztg., May 27, 1899, 312.

GENTIANACEÆ.

Gentian Root—Investigation of the Gelatinous (Pectous) Constituent.—E. Bourquelot and H. Herissey have isolated the gelatinous body of gentian root by digesting three quarters of an hour at from 80°–90° in water acidulated with hydrochloric acid; the clear liquid is then precipitated by

alcohol at 90°. The jelly thus obtained is strained through fine muslin, washed with alcohol, then re-dissolved in water and again precipitated by alcohol; after a final washing with ether the product was dried between sheets of filter paper, and then in the air. The results of some experiments showed that there must be either some resinous body present in the gentian root which has the power of preventing its solution in water, or that pectose, suceptible during desiccation or trituration of being transformed from soluble pectin into insoluble pectic acid, is present. The authors eventually found that with a mineral acid, a very different product was obtained to that got by water only. It is possible in the first case to obtain a pectin mixed with hydrates of carbon strongly dextrogyre, separated by the acid from the cellular membrane.—Chem. News, Aug. 26, 1898, 108; from Journ. de Pharm. (6) vii., No. 10.

APOCYNACEÆ.

Nux Vomica—Separate Estimation of Strychnine and Brucine by the Periodide Method.—H. M. Gordin and A. B. Prescott, in the course of their researches on the estimation of alkaloids as periodides (which see under "Organic Chemistry"), found that, along with a modification of Dunstan and Short's method of separating strychnine from brucine (see Proceedings, 1884, 312), the periodide method afforded as convenient a way of estimating the amount of the two alkaloids separately in nux vomica. The amount of total alkaloid having been ascertained in an acidulated solution abtained from nux vomica in any suitable way, by the periodide method, the process is further conducted as follows: 50 Cc. of the acidulated solution, representing 2 Gm. of nux vomica, is run from the burette into an Erlenmeyer flask of the capacity of about 300 Cc., 10 Cc. of a 2 per cent. solution of sulphuric acid is added, followed by enough water to make in all about 200 Cc. The 25 Cc. of a 5 per cent. solution of potassium ferrocyanide is run in, the flask is stoppered, and the contents are shaken continuously for about half an hour. Now filter, wash the precipitate on the filter repeatedly with water containing 1 per cent. of sulphuric acid, till a few drops of the filtrate diluted with a little water have no bitter taste. The filter is then pierced and the precipitate rinsed with the wash bottle into a 100 Cc. flask. Then add 20 Cc. of a 5 per cent. solution of zinc sulphate, and keep the flask on a boiling water bath for about 15 minutes. The zinc sulphate decomposes the strychnine ferrocyanide, strychnine sulphate enters into solution, and zinc ferrocyanide is precipitated—the brucine phosphate having been washed away by the previous treatment. The flask is then completely cooled, and water enough added to make 100 Cc.; of this 50 Cc., representing 1 Gm. of the nux vomica but deprived of the brucine, are then filtered off, run from a burette into a 100 Cc. flask containing 20 Cc. of decinormal iodine solution and about 2 Cc. of dilute hydrochloric acid. The amount of iodine

in excess is then ascertained by means of standard solution of sodium thiosulphate, and the amount consumed thus determined by subtracting from the original quantity employed; and by multiplying the amount of consumed iodine by the fraction 43.9, the percentage of strychnine is ascertained. For the mixed alkaloid the factor is 47.845; for brucine alone, it is 51.79. The authors show by experiment, recorded in a table, that the method is fairly satisfactory, if the well-known difficulties of separating the two alkaloids are taken into consideration.—Amer. Pharm. Journ., Jan., 1899, 18–19.

Nux Vomica—Insufficiency of Acid Directed in the Official Assay of its Preparations.—W. O. Richtman calls attention to the necessity of a larger quantity of decinormal sulphuric acid than is directed for the assay of the solid or fluid extract of nux vomica. It is true that 10 Cc. of decinormal acid are sufficient for 2 grammes of extract containing 15 per cent. of total alkaloids; but the 4 grammes of concentrated percolate, which are to be taken for the preliminary assay, are an indefinite quantity as regards the amount of total alkaloids, and usually contain a larger quantity of alkaloid than can be saturated by 10 Cc. of decinormal sulphuric acid. Hence the author recommends that a somewhat larger amount, say 15 Cc., of decinormal acid be directed and used. The author also prefers decinormal caustic potassa in place of the centinormal solution, on account of greater convenience. The slight error of reading the end reaction does not justify the use of the more dilute solution. Finally, he finds cochineal solution more serviceable than Brazil wood as indicator. The reaction is quite as delicate, and the prepared cochineal solution is more stable than that of Brazil wood.—Pharm. Review, May, 1899, 208–210.

Nerium Oleander—Strophanthin a Constituent.—Dubigadoux and Durien have isolated a glucoside from the milky juice of the Algerian oleander, which they state to be identical in chemical reaction and physiological effects with strophanthin.—Pharm. Journ., Jan. 21, 1899, 52; from Jour. de Pharm. et Chim. (6), 8, 433.

Gelsemium—Morphology of the Rhizome and Stem.—Joseph D. Seiberling observes that, though the structure and more especially the chemistry of gelsemium have been frequently investigated, there are still a number of points in the development as well as morphology of this important drug that require consideration. In order to clear up some of the points related to the structure, he has undertaken a comprehensive study of the morphology of the rhizome, overground stem and root, procuring for this purpose living specimens of the plant from nurseries near Philadelphia, Pa., and from Fayetteville, N. C. His results are given in a lengthy paper, illustrated with photogravures showing the rhizome with roots and part of the overground stem (see Fig. 51) and also with sectional diagrams of these several parts, which may be consulted in detail in the original.

For the purposes of this report it may serve to recapitulate the structural feature of the several portions examined, as follows:

Rhizome: Cork, 18 to 20 cells; collenchyma wanting; parenchyma,

FIG. 51.

Gelsemium Sempervirens.

containing oil, starch and crystals of calcium oxalate; bast fibres; cambium: medullary rays; ducts and fibriform tissue; internal phloem; hollow center eccentric.

Overground Stem: Cork, 4 to 6 cells. Collenchyma, 4 to 8 cells, containing chlorophyll. Parenchyma, containing starch, oil and crystals of calcium oxalate. Bast fibres. Cambium. Medullary rays. Ducts and libriform tissue. Internal phloem. Hollow center central.

Root: Cork, 16 to 18 cells. Collenchyma wanting. Parenchyma containing starch, oil and crystals of calcium oxalate. Bast fibres wanting. Cambium. Medullary rays. Ducts and libriform tissue. Internal phloem wanting. No hollow, but elements of primary fibro-vascular bundle in centre.

While certain new features have come to light, the author observes that in the opinion of Prof. Kraemer, who appears to have encouraged him to make the investigation, all future investigations of the drug, to be of any

value, must be made in the home of the plant. The paper is supplemented by a profuse reference to the literature on the subject of *gelsemium sempervirens* and gelsemine.—Amer. Journ. Pharm., Aug., 1898, 378–385.

SAPOTACEÆ.

Hevea Braziliensis—Cultivation.—In the "Kew Bulletin" (cxlii., 241), some valuable information is given concerning the habits, propagation and cultivation of *hevea brasiliensis*, the plant which yields the Para rubber. The propagation with cuttings has hitherto been attended with only moderate success, and is found most convenient by means of the seeds. These are, however, difficult to collect in their original habitat, the dense growth of the Amazonian forests, but they are now readily obtained from trees under cultivation in India, Ceylon, Straits Settlements and other tropical parts. If quite fresh, they bear transport for a period of three or four weeks. The plant, a moderately tall tree, begins to flower and fruit at about six years old, but for planting purposes the seeds of more mature trees—about twelve years old—are preferable. The most suitable soil and situation of the trees is fairly flat land, at about sea level, with good alluvial soil, preferably jungle land, and not sandy, and not subject to frequent floods or strong winds. In Ceylon the flowers appear soon after—about February—the leaves turn brown and drop off; and the large woody fruits, each containing three large, oily seeds, mature in July and August, opening with explosive violence, and scattering the seeds to some distance.—Pharm. Journ., Oct. 22, 1898, 437.

Rubber—Varieties from the Fiji Islands.—The "Kew Bulletin" (*139*, 164) describes the characters of some rubbers received from Fiji in response to a request for specimens of all plants yielding a milky juice. Among these a rubber from *alstonia plumosa*, which is described as abounding in the forests, is likely to prove a useful product. The samples received appear, however, to have been improperly prepared, and the rubber from this source will be useless unless this is remedied. Another specimen, obtained from a tree called "Baka" (*ficus obliqua*, Forst. f), is regarded as suitable for mixing purposes, while a third sample, obtained from the "Ban" tree (possibly a member of the *sapotaceæ*, but not identified) proved also to be slightly elastic. Other specimens, obtained from the "Masalili" (*carruthersia scandens*, Seem.) and the "Malawaci" (*trophis anthropophagorum*, Seem.), were entirely deficient of elastic properties, and are reported to be of no commercial value.—Pharm. Journ., Aug. 6, 1898, 117.

Caoutchouc—Methods of Preparation in Different Countries.—L. Lindet describes the various methods employed in different countries for the coagulation of the latex of caoutchouc producing plants. As is well known, heat is the commonest agent employed: the juice may be heated to boiling, as is done in Mexico; or it may be spread on tiles and exposed

to the action of smoke, as is done in Brazil and Venezuela ; or thickening may be accomplished by the direct action of the sun's rays, as practiced in West Africa, the Congo, etc. In Brazil, coagulation is brought about by alum ; on the Ivory Coast salt is used ; sulphuric acid in Maranham ; in Madagascar the juice of the lemon, and certain vegetable infusions are used in Peru and also in Madagascar.—Pharm. Journ., Oct. 29, 1898, 457, from Bull. Soc. Chim. de Paris, xix, 812.

Gutta Percha—Method of Collection.—Dr. E. F. A. Obach describes the method pursued by the Malays for collecting gutta percha. The tree furnishing this product, *palaquium gutta*, is large, having a cylindrical trunk with a diameter of two or three feet and a height of about eighty feet. This tree is confined to a comparatively small geographical area which comprises the southern part of the Malay Peninsula and the islands of Borneo and Sumatra. The latex or milky juice is contained in single cells which are arranged in longitudinal rows and chiefly occur in the inner parts of the bark. They occur also in the pith and leaf tissues, but not in the wood. To obtain the latex, the Malay invariably fells the tree, chops off the branches and cuts rings in the bark at distances of from twelve to eighteen inches along the trunk. The juice exudes, and soon fills the grooves. In the better kinds of trees it quickly coagulates and is scraped off with a knife. In inferior trees coagulation takes place less promptly and the juice has to be caught in cocoanut shells placed beneath. After collection, the latex is gently boiled, either with or without adding water and is finally made into blocks of various shapes for the market. The yield of latex varies with the tree, the method of collection and the season of the year. The latex is said to run more freely directly after the rainy season is over, and a much larger yield is said to come from a felled tree than from one merely incised. For this reason, the Malays always employ the destructive method of felling the tree. The average yield of gutta percha from an adult tree of good quality is less than two and a half pounds, the value of the total yield of such a tree being only about 8 s. 9 d. Bark, sawdust, ground sago, stones, etc., are worked into the blocks sent to market.—Pharm. Review, Nov., 1898, 426 ; from Journ. Imp. Inst., *4*, 137.

Gutta-Percha—Preparation by Extraction from Leaves, Plants, etc.—According to a recent English patent, gutta-percha is extracted from leaves and other parts of plants, as follows : The dried and comminuted material is heated and stirred under pressure with soda solution until the residue only contains gutta-percha and unchanged cellulose. The mixture is then filtered, washed and expressed. The residue of expression is dried, digested in suitable vessels with toluol several times until completely extracted, the first portion being set aside for further treatment, the following for the extraction of fresh material. The toluol is secured by distillation, the residue is treated with 1½ to twice its volume of 90 per

cent alcohol, and the precipitated gutta-percha washed with alcohol and water, and dried in a current of air. The extraction, under certain modifications, can also be made with carbon disulphide instead of toluol.—Chem. Ztg., 1899, 26.

STYRACEÆ.

Benzoin.—Official Definition of Quality and Kind.—Dr. Karl Dieterich, speaking of the admission of both Siam and Sumatra benzoin into the new British Pharmacopœia, expresses the opinion that Siam benzoin is the only kind that deserves pharmacopœial recognition. Sumatra benzoin is too variable in quality, and generally too impure for the purpose of medicine and pharmacy, but being admitted into the British Pharmacopœia, along with Siam benzoin, the author considers it necessary that separate descriptions and analyses of the two kinds of benzoin should be provided. So far as Siam benzoin is concerned, the following description is recommended:

A resin imported from Siam in flat or rounded pieces, brown outside and white inside. Heated in a water-bath it gives off a very pleasant odor; as the heat is increased the odor becomes pungent, owing to sublimation of benzoic acid. If a little finely-pulverized benzoin is warmed with a solution of potassium permanganate, no odor of oil of bitter-almonds should be perceptible even after the mixture has stood some time. If 10 Gm. are exhausted with hot 96 per cent. alcohol, until a few drops evaporated in a watch-glass leave no residue, and the proportion insoluble in alcohol is determined by drying it at 100° C., the latter should not exceed 1 per cent. The alcoholic solution itself should color blue litmus paper a bright red, and on addition of water should become milky. Siam benzoin should not leave more than 1.5 per cent. of ash on incineration. If exactly 1 Gm. of finely-powdered benzoin be mixed with 10 Cc. seminormal alcoholic potash and 50 Cc. of alcohol, and after exactly five minutes titrated with semi-normal sulphuric acid, using phenolphthalein as indicator, the acid number obtained should be between 140 and 170. If 1 Gm. of benzoin is macerated in 20 Cc. seminormal alcoholic potash, and 50, Cc. of benzol sp. gr. 0.700, in a glass-stoppered bottle for twenty-four hours, at the ordinary temperature, and thereafter the mixture titrated with semi-normal sulphuric acid and phenolphthalein, the saponification-number obtained should be between 220 and 240. The ester-number, calculated from the saponification and acid numbers, should be 50 to 75.

If the Sumatra benzoin is admitted, it should be separately described, and be identified by means of the cinnamic-acid reaction; the maximum of ash required should be 1.5 per cent., the proportion insoluble in alcohol not more than 30 per cent., the acid-number 100 to 130, the ester-number 65 to 125, and saponification number 180 and 230.—Chem. & Drugg., Nov. 12, 1898, 791.

ERICACEÆ.

Uva Ursi—Description.—F. H. Knowlton gives a brief but comprehensive description of the bearberry, *arctostaphylos uva-ursi*, accompanied by cuts showing the flowering stem, half natural size, a portion of a fruiting stem, natural size, and a single leaf, double natural size, and exhibiting the peculiar reticulated under surface of the same. For comparison, the leaves of *vaccinium vitis idæa* and of *chimaphila umbellata* are also shown, since both of these are occasionally used as adulterants of uva ursi leaves. The paper may be conveniently consulted in Merck's Report, January, 1899, 7–8.

COMPOSITÆ.

Insect Powders—History.—The "Kew Bulletin" (cxliii., 297, et seq.) in an article on insect powders, mentions that the inhabitants of Asiatic countries south of the Caucasus kept secret all the details connected with the production and source of the insect powder, now known to be derived from the rosy flowers of a native plant of the Caucasus—*pyrethrum roseum*. Early in this century, however, an Armenian merchant learned that the powder was obtained from the dried and pulverized flower-heads of a species of *pyrethrum* growing in the mountain region of what is known as the Russian province of Transcaucasia. The history of the Dalmatian species of *pyrethrum*, *P. cinerariaefolium*, Trev., is still a mystery. There is reason to believe that the Caucasian species is not cultivated, whilst the Dalmatian plant is generally considered to be cultivated, though no definite information can be obtained on this point, owing to the jealous watch which the inhabitants keep in order to guard their valuable monopoly.—Pharm. Journ., Nov. 12, 1898, 505.

Neurolaena Lobata—Proximate Examination of the Leaves.—Drs. B. H. Paul and A. J. Cownley have subjected the leaves of *neurolaena lobata*, which are used in the Windward Islands as a substitute for quinine and as a most valuable remedy in dysentery, to proximate examination. These leaves have an intensely bitter taste, and contain a small percentage (0.10 per cent.) of alkaloid to which this bitterness as well as remedial value is doubtless due. As obtained by the authors, it is uncrystallizable, readily soluble in acids, which it neutralizes, and reprecipitated by ammonia water. The specimen examined was obtained direct from the Windward Islands through the British Colonial office.—Pharm. Journ., July 16, 1898, 51.

Insect Powder—Valuation.—Edwin Dowzard, using cockroaches, adds the physiological test to the ether-soluble test for the valuation of insect powder. He has found the time required to stupefy cockroaches to be usually in proportion to the amount of ether-soluble substance in the sample. The valuation is carried out as follows:

Estimation of Ether-Soluble Matter.—Two grammes of the sample are

mixed with 50 Cc. of ether (in a stoppered cylinder), the mixture being shaken at intervals during two hours; 25 Cc. (= 1 Gm. powder) of the clear ethereal solution is evaporated in a tared beaker and the residue weighed.

Physiological Test—Two Gm. of the sample are transferred to the beaker, a cockroach is then introduced, and the number of minutes which elapse before the insect becomes stupefied are noted.

The following table gives the results obtained with twelve samples of insect-powder:

Sample.	Physiological Test.	Ether-extract.
1	4 minutes	8.4
2	5 "	7.6
3	5 "	7.4
4	5 "	6.6
5	5 "	6.4
6	5 "	5.6
7	5 "	5.4
8	5 "	5.0
9	7 "	5.0
10	8 "	3.2
11	12 "	4.2
12	12 "	3.0

—Chem. & Drug., June 10, 1899, 936.

Insect Flowers—Assay of the Commercial Powder.—Cæsar and Loretz propose a slight modification of Durrant's test for insect powder, which consists in continuing the extraction of the sample with ether so long as the solvent takes up anything, instead of, as required by the original test, exhausting with a specified quantity of ether. They find that the powder from closed flowers will yield from 8 to 9.5 per cent. of extract, while open or partly open flowers yield 6.5 to 7.5 per cent. The color of the extractions varies from pure yellow, dark-yellow, brownish-yellow to greenish-yellow, while that prepared from stems is of a dirty-green color and the residue of evaporation amounts only to 5.5 per cent. They furthermore find that the insecticide properties of insect powder are fully represented in the ether extract, and are not due to any alkaloidal bodies that the insect powder may contain.—Pharm. Centralh., Oct. 6, 1898, 727.

Wormwood—A New Crystalline Neutral Principle.—Adrian and Trillat have isolated from *artemisia absinthium* a new crystalline body, which forms fine straw-yellow needles, free from bitterness, without physiological action, and incapable of reducing Fehling's Solution. The formula of the new body is given as $C_{53}H_{51}O_{20}$ or $C_{52}H_{51}O_{20}$. The crystals melt at 165° C., are insoluble in water or ether, but dissolve in warm amylic alcohol, in chloroform, and in acetone. It was obtained from the

alcoholic extract of the drug, after removing the absinthin, by treatment with amyl alcohol.—Pharm. Journ., Jan. 7, 1899, 1; from Compt. rend., cxxvii, 874.

Another new crystalline body has since been isolated from wormwood by the same author, which they call

Anabsinthin, and for which they give the formula $C_{18}H_{24}O_4$. It occurs in long white prismatic needles, having a persistent bitter taste, and, when dried at 120° C., melting at 258° to 259° C. After exposure to the air, it melts at 236° to 238° C. With concentrated sulphuric acid it gives a bright red-violet color, turning to blue, and with dilute hydrochloric acid, a brown color. It gives no reaction with Fehling's Solution, does not form a compound with phenyl-hydrazine, and appears to be devoid of marked physiological action.—Pharm. Journ., Jan. 28, 1899, 75; from Compt. rend.. cxxviii, 115.

Calendula—Use in Allopathic Practice.—George M. Beringer observes that although marigold is an official drug, it has hitherto not received very extensive use in allopathic practice. Recent indications, however, point to the fact that physicians of the old school are beginning to test it. The fluid extract and tincture have been in use, and the latter is displacing tincture of arnica for local application, while dentists seem to prefer it to tincture of myrrh for a mouth wash. The carefully dried and finely pulverized plants have also found application as a dusting powder for chafed surfaces, &c. Mr. Beringer, in view of the present tendency, communicates a formula for an ointment, an oil (by infusion) and a collodion, all of which have been found useful for a variety of purposes. These formulas will be found under their proper headings elsewhere in this report.—Amer. Jour. Pharm., June, 1899, 268.

Grindelia Robusta—Proximate Constituents.—John Glassford has determined the proximate constituents of *grindelia robusta*, following in the main the scheme of Dragendorff, with the following results: Moisture, 5.25 per cent.; fatty matters, including chlorophyll, 7.34 per cent.; acrid resin, soluble in benzin, 9.80 per cent.; coloring matter, soluble in ether and water, 0.20 per cent.; grindeline (?), a trace; resin insoluble in benzin, 7.0 per cent.; volatile oil and caoutchouc, 0.26.; tannin and tannin-like coloring matter, a trace.—Merck's Rep., July 1, 1898, 394–395.

Liatris Odoratissima—Proximate Analysis of the Leaves.—Charles Falkenhainer gives the results of a proximate examination by Dragendorff's method of the leaves of *liatris odoratissima*, Mich., which may be briefly condensed as follows: Petroleum ether extract, 3.25 per cent. (wax, fat, coumarin); ether extract, 4.26 per cent. (wax, resinous matter, coumarin); absolute alcohol extract, 5.74 per cent. (containing 0.43 per cent. cane sugar, but no glucose); water extract, 42.96 per cent. (= 17.28 per cent. mucilage and albuminous matter, 4.75 per cent. glucose, but no

cane sugar); alkaline water extract, 8.44 per cent. (= 2 per cent. mucilaginous matter); acidulated water extract, 2.59 per cent. Starch was not found in the leaves. The air-dry powdered leaves lost 6.1 per cent. on complete drying at 110°, part of this loss being due to volatilization of coumarin. The residue from drying left 8.75 per cent. of ash, of which about 70 per cent. was soluble in water. The author extracted and purified the coumarin of the leaves to a constant melting point (66°–67° C.). The examination of the substance, and combinations made, agree well with the results of previous observers.—Amer. Journ. Pharm., March, 1899, 133–137.

DIPSACEÆ.

Scabiosa Succisa—A Cattle Poison.—According to J. Moir, the popular attributes of the "devil's bit" (*Scabiosa succisa*) as a poison are well founded. He finds by actual experiment that when the fresh plant is chewed by cattle it causes violent inflammation of the mouth and tongue. Attention was called to this from the inspection of some cattle at first suspected of suffering from foot and mouth disease, but which were ultimately proved to have eaten "devil's bit."—Pharm. Journ., May 13, 1899, 432; from Vet. Record, *11*, 524.

Chione glabra—Proximate Examination of the Root-Bark.—Drs. B. H. Paul and A. J. Cownley have subjected a specimen of the root-bark of *chione glabra* from the Windward Islands to proximate examination. The local name of this bark is "Violette," and its medicinal reputation is that of a valuable tonic and also an aphrodisiac. The pale root-bark has a strongly aromatic odor, a slightly astringent taste, and yielded about 1.5 per cent. of a pale yellow volatile oil, having a specific gravity higher than that of water, and whose behavior to reagents shows it to be a phenol. It has a hot pungent taste and the aromatic odor of the bark. Treatment of the bark with various solvents in the presence of alkali gave negative results for an alkaloid. The bark yields to alcohol about 25 per cent. of a dark-colored extract, having a slightly bitter taste. It contains a tannin-like body, and another substance of the nature of saponin.—Pharm. Journ. July 16, 1898, 51.

RUBIACEÆ.

Cinchona—Statistics Concerning its Culture in Java.—M. Busemann states that the export of cinchona bark from Java via Amsterdam during 1898 was not alone the largest in the history of cinchona cultivation in the Dutch East Indies (11,150,000 pounds), but that also the largest average price was obtained. In 1897, 8½ millions (in round numbers) were exported; in 1896, 10 millions; in 1894 and 1895, nearly 9, and in 1893, a little over 7 million pounds of bark were exported. In addition to the large quantity of bark exported, the quinine factory established at

Banding, Java, in 1897, produced during 1898 about 500,000 ounces of quinine sulphate, the larger part of which was exported to London, and yielded satisfactory returns. Considerable quantities were also sent to the New York and Amsterdam markets, the remainder going to Australia, China, Japan and the Straits Settlements. With increased facilities, the output of the Banding factory will doubtless be largely increased during the current year, and it is therefore not likely that the export of bark will be as large as during the past year.—Apoth. Ztg., May 27, 1899, 310.

Cinchona Bark.—Modified Assay Process.—Ekroos proposes the following process for the assay of cinchona bark, which is a modification of that of C. C. Keller: 12 Gm. of the finely-powdered bark are macerated with occasional agitation in a mixture of 120 Gm. ether and 10 Cc. of 10 per cent. solution of sodium hydrate during 3 hours, and 10 Cc. of water are then added to the mixture; 100 Gm. of the clear ether solution are then weighed direct into a separatory funnel, shaken with 30 Cc. $\frac{N}{10}$ sulphuric acid, the ether washed twice successively with two portions of 20 Cc. of water, and the united acid-aqueous liquor is titrated with $\frac{N}{10}$ potassium hydrate to determine the excess of acid, hæmatoxylin being used as indicator. 1 Cc. of $\frac{N}{10}$ sulphuric acid corresponds, according to Keller, to 0.034 Gm. alkaloid.—Apoth. Ztg., Dec. 3, 1898, 848; Arch. d. Pharm., 1898, No. 5.

False Cinchona Barks—Recent Importation from South America.—C. Hartwich calls attention to several false cinchona barks which have recently reached Europe from various parts of South America. One of these is designated a "Pesudo-Cinchona," which is probably derived from *antirrhœa verticillata*, D. C. A second bark, designated as "china cuprea," was obtained from Bucamarauga, Columbia. The author was unable to identify this with certainty, but it possesses great resemblance to the false cinchona described by Vogel as being the bark of *buena vendata*, Kl. A third variety comes from the island "Domingo," and is simply designated "Cinchona bark." It appears to be derived from a plant belonging to the combretaceæ, and possibly may be found near the *bucida*. A fourth false bark, designated as "Cutea Chinæ from Columbia," the author was unable to identify. It comes mixed with a fifth variety of false cinchona, which is doubtless derived from a member of the genus *croton*, possibly *croton malambo*, Karsten. These different barks are described, their microscopic and macroscopic characteristics are given, accompanied with suitable illustrations. Arch. d. Phar., 1898, *336*, No. 9, 641–654.

Ipecacuanha—Cultivation in India: Value of Different Fertilizers.—Experiments made by David Hooper at Ootacamund, under the supervision of R. C. Proudlock, the Curator of the Botanical Gardens, show clearly the value of fertilizers upon the development of the ipecacuanha roots. Young cuttings of *psychotria ipecacuanha* were subjected to precisely identical conditions except as to fertilization. At the end of two

years the average height of the plants was found to be practically the same —11¼ to 11½ inches—but there was a marked difference in the weight of the roots from fertilized plants, and from plants grown in the ordinary unfertilized soil. Grown in super-phosphate soil, the average root weighed 5.6 Gm.; in powdered phosphate soil, 5.39 Gm., and in soil containing cattle manure, 5.3 Gm.; while in ordinary soil they weighed only 2.6 Gm. Pharm. Journ., April 29, 1899, 384.

Coffee—Decomposition Products of Roasting.—H. Jaeckle has made a comprehensive investigation of the decomposition products resulting during the roasting of coffee on an industrial scale. The material examined was the "condensation" which accumulates in the pipes leading from the roasters. He found in this acetone, furforol (furfuran), caffeine, ammonia, trimethylamine, formic acid, acetic acid (resorcin). These bodies are always produced, though in variable proportions, and may be regarded as the normal products of decomposition of the roasting process. Caffeine, furfurol and acetic acid are produced in notable quantities. The so-called "caffeol" of Bernheimer could not be determined among these empyreumatic products. There are doubtless other products formed, but these are insignificant in quantity, and not uniformly produced during the roasting process, as are the products before mentioned.—Apoth. Ztg., Nov. 5, 1898, 778; from Ztschr. f. Unters. d. Nahr. u. Genusm., 1898, 457.

Coffee—Source of Sawdust in the Grooves of the Seed.—The recent observation of H. Wirtz that coffee is sometimes adulterated with sawdust, by filling the longitudinal grooves of the seed with it, leads T. F. Hanausek to the observation that he had noticed this already early in 1897, but that he does not attribute this to intentional adulteration. The raw coffee appears to be subjected to a centrifugal process with sawdust for the purpose of removing the thin integument covering the seed. This gives to the bean a polished and clean appearance and color which is not possessed by the ordinary grades of Brazilian coffee. It is true, care might be exercised to remove all the sawdust from the grooves.—Apoth. Ztg., Nov. 5, 1898, 778; Ztschr. f. Unters. d. Nahr. u. Genusm., 1898, 399.

CAPRIFOLIACEÆ.

Viburnum Barks—Comparative Structure.—R. H. Denniston has made a microscopic study of the structure of a number of American viburnum barks for the purpose of comparison with and distinction from the official barks of *viburnum prunifolium*, L., and *V. opulus*, L. The author's examination embraced besides these two, the bark of *V. lentago*, *V. dentatum*, *V. nudum*, *V. cassinoides*, and *V. lantanoides*, Michx., all of which, with the exception of the last, are commonly substituted for *V. prunifolium*, L., while *V. lantanoides*, Michx., is sometimes collected for *V. opulus*, L. In summing up the results of his investigations it is shown that a great similarity exists between these different stem barks, both in cell

structure and contents. Between certain of the species, however, the differences are more marked, and careful study will enable an observer to detect the mixture of one bark with the other, even in a powdered state. The bark of

Viburnum Opulus is easily distinguished from that of other species in that: 1. It has much smaller cells in all of its tissues. The numerous masses of small cork cells are especially noticeable in the powder. The surface measurement of these cells is about 9″ by 14″, while the minimum size reached by these cells in other species is scarcely less than 20″ by 30″. 2. It is the only one in which the compact groups of bast fibres occur abundantly. 3. The stone cells are smaller and assume more varied forms. 4. A tangential view of the medullary ray shows the cells to be crowded closer together and somewhat smaller. The bark of

Viburnum prunifolium very closely resembles that of several other species, especially *V. lentago* and *V. cassinoides*. No bast fibers are found in *V. prunifolium* bark, but many wood fibers find their way into the powder and might easily be mistaken for the bast fibres. Bast fibers are of common occurrence, however, in all the other species examined. Tannin was found abundantly in all species but *V. prunifolium* and *V. lentago*. The author's paper is illustrated by engravings covering six plates exhibiting plainly the microscopical characteristics of the different barks.—Pharm. Archives, July, 1898, 137–138.

Sambucus Nigra.—Presence of a cholesterin-like body in the bark, similar to that found in the bark of *tilia europæa*, which see,

RHIZANTHEÆ.

Pitcher Plants—Stability of Enzyme.—The statements previously made by S. H. Vines (see Proceedings, 1898, 787) concerning the great stability and power of the proteolytic enzyme of pitcher plants (*nepenthes*) are verified by recent experiments by the same author relating to the action of high temperatures and alkalies upon it, which seem to prove it to be the most active of all known proteolytic enzymes. It is probably derived from a zymogen present in the gland cells. The discovery by Ramsden of true peptone among the products of digestion facilitates its classification; in this it resembles the tryptic ferment found by J. R. Green in germinating seeds, as also in the fact that it acts in an acid medium, thus differing from the trypsin of the pancreatic juice.—Pharm. Jour., Dec. 24, 1898, 665; from Annals of Botany, xlviii., 545.

In continuation of his experiments Prof. Vines confirms his previous statement of the remarkable stability of the enzyme of the pitcher plant. The enzyme is in all probability derived from zymogen present in the gland-cells. It is essentially tryptic in its character—probably a feature of all vegetable proteolytic enzymes—and closely resembles that of the germinating seed, but is more rapid and energetic in its action, and more

stable in its nature.—Pharm. Journ., May 27, 1899, 483; from Annals of Botany, *12*, 545.

UMBELLIFERÆ.

Ammoniacum—Necessity of Purification.—F. H. Alcock and John Kendrick, when making emplastrum ammoniacicum hydrargyro, had opportunity to confirm the wisdom of the revisers of the British Pharmacopœia 1898, in requiring the purification of the ammoniac. The present supply is wretched in composition. To completely remove the gum resin from its associated impurities, nearly a liter of water was required for 32.8 Gm. (one-tenth the British Pharmacopæia quantity) and the residue amounted to 6.45 Gm., and yielded on incineration 4.045 Gm. of ash. Good ammoniac should yield not to exceed 1 per cent of ash.—Pharm. Journ., March 25, 1899, 278.

Dill Fruits—Distinction of Commercial Varieties.—John C. Umney calls attention to the characters which distinguish the dill fruits grown in Europe from those grown in India and in Japan, as well as to the differences which he has observed in the oils distilled from them. Heretofore the English and Indian fruits have been used in England exclusively, the latter for the purpose of distilling essential oil, whilst in Germany dill fruits grown in Germany and also in Spain have been used for this purpose. The English and German fruits are exactly alike, the two mericarps being usually separated from the pedicel, each of them being oval and about one-sixth of an inch long and one-tenth to one-eighth of an inch broad, a decided brown in color, the dorsal ridges being inconspicuous, but the lateral much prolonged into the form of wings. Six vittæ are seen in each mericarp in transverse section. In the case of the Indian variety the same number of vittæ (except in a few cases) are observable, but the lateral ridges are not so prolonged and the color of the fruits is a paler brown, the mericarps being usually not divided. The botanical characters of the Japanese variety agree very closely with those of the Indian. A chemical examination and study of the volatile oils obtained from these several varieties of dill fruits proves that those obtained from the Asiatic seeds differ very markedly from the oils obtained from European seeds. In the Indian and Japanese oils the percentage of carvol is very considerably less, and their specific gravity is considerably higher, due to a body heavier than water to which Ciamician and Silber ascribe characters similar to those of apiol separated from oil of parsley. The oils from English and German fruits are practically identical with each other, provided that no separation of carvol has taken place, as appears to be the practice to some extent on the Continent, and in the instance of a sample of German oil examined by the author in connection with his present paper. The author considers it imperative that the English or Germam fruits should be used for the distillation of dill water, and that the characters of the

essential oil prescribed by the new British Pharmacopœia should be rigidly adhered to, thus excluding the Indian and the Japanese varieties, since it cannot be supposed that the apiol-like body contained in the latter is devoid of powerful physiological action.—Proc. Brit. Pharm. Comf., 1898, 374–376.

Thapsia Resin—Determination of Constants.—Dr. K. Dieterich gives in some detail the methods by which he determined the constants of the resin extracted from the roots of *thapsia garganica*. As is well known, this resin possesses peculiar vesicant properties, and great care is therefore necessary during the different operations required in the examination. Selecting 3 samples of genuine resin, of French origin, he obtained the following figures, based upon the anhydrous substance: Soluble in petroleum, 19.28–25.67 per cent.; saponification number of this portion, 251.94–360.18; soluble in alcohol, 83.46–89.32; saponification number of this portion, 367.86–405.55; total saponification number, 336.33–384.47. Insoluble in alcohol, 0–2.4 per cent.; water in resin, 7.43–10.336 per cent.; ash, 0.16–0.415 per cent. Two other resins, from doubtful sources, were also examined, but are not taken into the above calculation. —Pharm. Centralh., April 27, 1899, 257–261.

ARALIACEÆ.

Aralia Californica—Proximate Examination.—Wm. B. Monroe has subjected some rhizomes of *aralia californica* to proximate examination, which were received in the fresh moist condition from the Experimental Bureau of the University of California, a specimen being here shown in illustration by Fig. 52. The plant is common in shaded mountain ravines of the Coast Range, and is also found in Sierra County, California, preferring rich soil and an abundant moisture, growing most luxuriantly along streams. The rhizomes had an aromatic odor, contained 70.20 per cent. of moisture, and were operated upon in this condition. The official alcohol extracted 5.39 per cent., yielding a reddish-brown extract, about two-thirds of which was soluble in water. This aqueous solution contains both glucose (0.23 per cent.) and saccharose (0.13 per cent.) and, probably, some oxalic acid. The portion of the alcoholic extract insoluble in water, consisted chiefly of resinous substance. The residue of the recent rhizomes remaining after extraction with alcohol was then submitted to Dragendorff's scheme of plant analysis, which revealed the presence of fat or saponifiable wax, a little resin, mucilage, albuminous matter, minute quantities of dextrin, glucose and saccharose, some pararabin and a considerable amount of calcium oxalate, together with 2.22 per cent. of ash. From 1 kilogramme of the fresh material about 2 Cc. of volatile oil was obtained by distillation with water. This oil had a pale-yellowish color, and a very aromatic odor, resembling that of carrots, and becoming more pleasant on standing. It is lighter than water, soluble in

alcohol, and the water that distilled over with it was neutral. The rhizome also contained starch, estimated at 1.67 per cent. No saponin-like or other active constituent could be isolated.—Amer. Journ. Pharm., Oct., 1898, 489–492.

FIG. 52.

Aralia Californica.

RANUNCULACEÆ.

Hydrastis Canadensis—Assay by the Periodide Method.—H. M. Gordin and A. B. Prescott, in continuation of their researches on the availability of the periodide method for the assay of alkaloids (which see under "Organic Chemistry") have developed a method for the estimation of hydrastine and berberine in hydrastis root, which is based on the following principles: 1. Hydrastine is quite soluble in absolute ether, and forms, as has been shown by the authors, (see *Hydrastine Hexiodide*, under "Organic Chemistry"), a definite hexiodide when a weak solution of any of its salts is added to a large excess of iodine dissolved in potassium

iodide solution. 2. Berberine, on the contrary, is completely insoluble in ether, a fact which is easily demonstrated. 3. Of all the difficultly soluble berberine salts, the hydriodide seems to be the least soluble, particularly so in a very large excess of potassium iodide. It is important, however, that the berberine shall be perfectly pure. 4. If to a very dilute solution of a salt of pure berberine about ten to fifteen times the amount of acetone be added, and the solution then made strongly alkaline with a solution of sodium hydrate, *berberine-acetone* is precipitated, so completely, particularly after ten or fifteen minutes' shaking, that the filtrate is almost completely colorless, and no traces of alkaloid can be detected in it. This berberine-acetone is easily decomposed by boiling with mineral acid, with liberation of pure berberine.

Based upon these facts, the authors give their assay process in detail, of which the following is a brief outline: The alkaloids of the powdered roots are first set free by the action of an ethereo-ammoniacal mixture consisting of stronger ammonia water, 5 Cc.; alcohol, 5 Cc., and ether, 30 Cc. After drying, the powder is extracted with absolute ether, and the ether extract, after evaporation of the ether and solution of the residue in acidulated water, is used for the estimation of hydrastine by any suitable method—in this case as hydrastine hexiodide (the factor being 0.60403), either titrimetrically or gravimetrically. Through the powdered root left in the extraction apparatus air is passed till it is dry, and then the powder extracted with alcohol to exhaustion. The alcoholic extract, after dilution with water, evaporation of the alcohol and taking up the residue with diluted acetic acid, is used for the estimation of berberine. The berberine is first precipitated as berberine acetone, the latter washed, decomposed by the aid of acid, and the purified berberine estimated by standard solution of potassium iodide, using silver nitrate and ammonium sulphocyanate for titrating the excess used. By multiplying the number of Cc. of $\frac{1}{20}$ normal potassium iodide consumed by 0.167125, the percentage of anhydrous berberine in the root is obtained, as 1 Cc. of the potassium iodide solution is equal to 0.0167125 of berberine—Amer. Journ. Pharm., June, 1899, 257–266.

Delphinium Staphisagria.—A new alkaloidal constituent of the seeds, *Staphisagroine*, which see under "Organic Chemistry."

BERBERIDEÆ.

Podophyllum Emodi—Therapeutic Activity.—Drs. H. W. G. Mackenzie and W. E. Dixon have studied the physiological action and therapeutic properties of the podophyllins derived from *podophyllum emodi* and from *P. peltatum* respectively, and find that the product obtained from the Indian drug is not alone an active purgative and valuable therapeutic agent, but that it is nearly twice as effective physiologically as the podophyllin from the American drug. The active principles contained in the

crude resin of Indian podophyllum—crystalline podophyllo-toxin and podophyllo-resin—both act as excellent laxatives in small doses, without secondary constipation or other objectionable symptoms. But while both substances act very similarly on the alimentary tract, it is only the podophyllo-resin which exerts a true cholagogue effect, and that shows itself "rather by a large increase of the solids secreted than by an increased quantity." While both active principles exert their specific activity when injected hypodermically in alcoholic solution, so much irritation is produced as to forbid their employment in this manner.—Pharm. Journ., Nov. 19, 1898, 525 ; from Edin. Med. Journ., Nov., 1898.

RUTACEÆ.

Jaborandi—Solid Constituent of the Volatile Oil.—In a former "Report" (April, 1888, 44), Messrs. Schimmel & Co. stated that the fraction of jaborandi oil boiling above 260° C. contains a substance melting at 27° to 28° C. In an oil distilled recently the amount of this body was so considerable that the oil solidified on cooling, and from this it was separated by suction. Purified by recrystallization, it was determined to have the melting point of 28° to 29° C. It is apparently a hydrocarbon of the olefine series.—Schimmel's Report, April, 1899, 27.

Guaiac—Value as a Test for Oxidizing Agents.—Pierre Breteau finds that the blue color produced by guaiac resin, on contac with certain oxidizing agents, either by direct action, or through the medium of oil of turpentine, will appear under circumstances not yet published, and hence errors may easily be made. The phenonemon of turning blue depends on conditions little understood, so that, by even slightly varying these conditions, the reagent can no longer be trusted—for instance, according to Schœnbein, it equal volumes of tincture of guaiacum and aerated turpentine mixed, are shaken up with water, the white precipitate takes an intense blue color ; but according to the author, if this is only slightly modified, and the aerated turpentine is added to a mixture of water and tincture of guaiacum, the blue color does not appear at all, even after prolonged agitation and increase of temperature. Another experiment of Schœnbein's was repeated with blood, using also pure distilled water and absolute alcohol, but no phenomenon occurred ; but on the addition of a single drop of essence of turpentine the deep blue color appeared immediately It is also shown that traces of copper, which may possibly be present in distilled water, will cause the blue color to appear without the intervention of essence of turpentine. And again, ordinary ether, alcohol, and benzene have sometimes been found to turn tincture of guaiacum blue in the presence of essence of turpentine, while on other occasions, under apparently the same conditions, no coloration has been noticed ; doubtless the presence of copper or other impurities has been the cause of the coloration. Other experiments are described, using paper saturated with tinc-

ture of guaiacum for the detection of phosphorus and hydrocyanic acid, in which it is shown that the apparent results may be quite misleading, if even only a trace of copper is present.—Chem. News, Jan. 6, 1899, 11; from Compt. rend., cxxvii., No. 17 (Oct. 24, 1898).

Schimmelia, nov. gen. and *S. oleifera*, nov. sp., the source of *West India sandal oil*, which see under "Organic Chemistry."

Schimmelia Oleifera?—Identity with a Previously Described Species.—Further investigations have shown that the West Indian sandal-wood plant, believed by Mr. Holmes to belong to a distinct genus, belongs to the genus *amyris*, and has been identified by Dr. Urban, of Berlin, to whom specimens of the plant parts had been sent by Mr. Holmes, to be

Amyris balsamifera, L.—This genus has been placed by Bentham and Hooker in the "Genera Plantarum" in the *burseraceæ* instead of the *rutaceæ* to which it belongs, hence the failure of Mr. Holmes and of Mr. Hemsley to accurately trace it. The genus *amyris* has recently been placed in the Rutaceæ by Engler and Prantl in "Die Natürlichen Pflanzenfamilien" (1896). The specimens of *amyris balsamifera, L.*, in the New Herbarium have rather larger leaves than the plant described by Mr. Holmes as "*schimmelia oleifera*," and narrower, more elliptical fruits, but otherwise do not appear to differ. The "*schimmelia*" undoubtedly agrees with the *amyris* described by Engler and Prantl, except that the stamens in *amyris* are not stated to be of unequal length, *i. e.*, four longer than the other four, as they are in "schimmelia."—Pharm. Journ., March 4, 1899, 205.

MALVACEÆ.

Cotton Root Bark—Description and Microscopical Examination.—Frank William Morgan communicates the results of a microscopical and micro-chemical examination of cotton root bark, fresh, and gathered during the winter months. The dried bark is from 2 to 4 lines in thickness, with very thin cork, easily removed, of a reddish-brown color, so changed from the yellow color of the fresh bark. The outer surface is reticulately wrinkled, possesses numerous small, round, black dots of a fungus or lichen; occasionally round scars and transverse warts appear, which are fissured in the middle along their whole length (being lenticels). The inner surface is yellowish-white, reticulate and shining, the back being easily separable from the rest of the bark, in thin, transparent, porous, reticulately-marked plates—the inner bark then presenting a white appearance and numerous small, round dots. The microscopic features are shown in two cuts, the first a transverse section of the bark, exhibiting the following features: cork, crystals of calcium oxalate, bast, medullary rays, cells containing tannin, sieve; the second, a longitudinal section, shows the cork cells, parenchyma, bast fibre, secretion reservoirs, medullary rays, cells containing tannin, and crystals of calcium oxalate. The tannin

occurs in isolated parenchyma cells throughout the bark. Calcium oxalate crystals are found frequently, in the primary medullary rays occasionally. The secretion reservoirs, containing oil and resin, occur frequently among the parenchymatous tissue lying near the phloem, and are large enough to be distinguished by the naked eye in the fresh bark. These secretion reservoirs in cotton root appear not to have been mentioned before, and it is not unlikely that it is on the products secreted here that the value of this drug depends. Their contents are very soluble in acetone and alcohol, slightly soluble in chloroform and diluted alcohol, and insoluble in water. The reservoirs are apparently of lysigenous origin.—Amer. Jour. Pharm., Sept., 1898, 427–432.

STERCULIACEÆ.

Kola Nuts—Preservation, etc.—L. Bernegau, who has devoted much time and attention to the study of kola nuts and their medicinal and economic uses, finds that the fresh nuts may be preserved, precisely like fruit preserves, in sugar syrup to which a little citric acid has been added. When they are dried at the ordinary temperature they shrivel up, are liable to become musty, and lose their efficiency in a considerable degree. But if the fresh drug is cut into thin slices, it may be dried sufficiently to permit pulverization by exposing them on trays during 24 hours at a temperature not exceeding 80° C. The powder so obtained will then serve well for making the different preparations used in medicine, as well as for the preparation of biscuits, crackers, cakes, and other nutrient kola preparations that are in popular demand, a little sodium phosphate being a desirable addition to these preparations. The practice of preserving kola nuts in their fresh condition and color by imbedding them in fresh potatoes hollowed out for the purpose, as recommended by Schweinfurt, is efficient. But the author finds it to be better to resort to peat-mull for this purpose. The entire nuts, with their two cotyledons intactly united, are dried during several days at the ordinary temperature by spreading them out between layers of peat-mull, the latter absorbing the moisture from them. In this way they retain their original appearance, their constituents and taste intact. At the instance of the author, O. Schumm has communicated the following method for the

Assay of Kola Nut and its Extracts.—The extract from 20 Gm. of the dried and powdered drug, or 20 Gm. of the fluid extract, is placed in a 50 Cc. flask with 4 Gm. of 10 per cent. solution of soda, and the mixture carefully shaken occasionally during 5 minutes. It is then transferred to a separator of 100 Cc. capacity, the flask is rinsed out with 20 Cc. of chloroform, the chloroform added to the extract, and this shaken out with it, the operation being repeated twice with 20 Cc. of fresh chloroform. The united chloroform solutions are then washed with 2 Cc. of water, evaporated to nearly dryness, the residue dissolved with the aid of gentle

heat in 20 Cc. of normal hydrochloric acid, and filtered into the separator, carefully rinsing the evaporating vessel and washing the filter. The acid solution is then made strongly alkaline with ammonia, frequently shaken during 15 minutes, and then shaken out three times successively with 20 Cc. each of chloroform. The chloroform having been distilled off from the united liquids, the residue is dried to constant weight. The method has been found reliable, and has been practically applied to the assay of Fluid Extract of Kola (which see under "Pharmacy.")—Pharm. Ztg., Sept. 24, 1898, 683–684.

Gum M'beppe or Kongosita—A New Gum from Senegal.—Under the name of gum m'beppe or kongosita, a gum was received from Senegal which has been identified by Dr. E. Heckel as being derived from

Sterculia Tomentosa, Guill. and Perrot.—It has been examined by Prof. Schlagdenhauffen, who found it to contain 19.8 per cent. of hygrometric water, and that, though swelling rapidly in cold water, it does not produce a mucilage, while boiling water dissolves only 5.8 per cent. of it. If, however, the gum is heated with twenty times its weight of water, in a sealed tube placed in an oil bath for four hours at a temperature of 120° C., a colorless solution is produced, which possesses when evaporated the characters of arabin. When tragacanth is subjected to similar treatment, it requires twice as much water as m'beppe gum, it must be heated twice as long, up to 135° C., and then yields only 80 per cent. of arabin. As the new gum is quite inexpensive, it is suggested that it might serve as a cheap source of arabin and thus as a substitute for gum arabic. It closely resembles the gum known in Indian bazaars as Kutira gum—obtained from *sterculia urens* —and like the latter has a strong odor of acetic acid when kept in close vessels. M'beppe gum differs from tragacanth in not giving a color-reaction with iodine, and in yielding 7.24 per cent. of ash ; whereas tragacanth produces a rose, blue, or violet color with iodine, and yields only 3 per cent. of ash.—Pharm. Journ., Feb. 18, 1899, 139 ; from Rev. des Cultures Coloniales.

TILIACEÆ.

Tilia Europæa—Cholesterin-like Body in the Bark.—W. Bräutigam has obtained a cholesterin-like body from fresh linden bark by extracting it with ether, washing the glutinous brownish residue of evaporation with 90 per cent. alcohol as long as this becomes colored, boiling the residue with solution of potassium hydroxide. collecting the undissolved portion on a filter, washing it with hot water, and dissolving it in ether. The principal impurity now consisted of a soap, which was removed by evaporating the ether, taking up the residue in hot absolute alcohol, adding aqueous solution of calcium chloride to form an insoluble lime soap, and, after evaporating the whole to dryness, extracting the mass with ether. The residue of this final evaporation of ethereal solution, after repeated crystallization

from hot 90 per cent. alcohol, yielded odorless and tasteless, satiny-glistening needles, which were easily soluble in ether, petroleum ether, benzol and chloroform, insoluble in water and alkalies, melted at 246° C., and give reactions which place the substance in the group of phytosterins.—Pharm. Ztg., 1898, No. 105, 940.

Tilia Europæa—Substitution of the Flowers by those of Tilia Americana, L.—Caesar and Loretz observe that owing to the strict enforcement of certain police regulations it has become difficult to collect linden flowers in Germany, and that for the past two years handsome green flowers have been imported into that country from Italy. These flowers, however, prove to be those of *tilia americana, L.*, which yield infusions possessing an entirely different taste from that produced by the official drug, while the water distilled from them has an unpleasant odor.—Pharm. Centralh., Oct. 6, 1898, 726.

GUTTIFERAE.

Allanblackia Stuhlmannii, Engl.—Examination of the Fat.—Dr. Henriques and Dr. H. Künne communicate the results of their examination of the fat prodoced from the African Tallow tree, *allanblackia stuhlmannii*, Engl., which is supplied in the form of large compact pieces shaped like ostrich eggs, weighing from 700 to 800 Gm. under the name of

Mkani fat. It is employed in a bast fabric, is internally yellowish white, very hard, has a faint aromatic taste, and contains much water and dirt. Two samples were subjected to examination: No. 1, a sample from Bagamoyo; No. 2, a sample that had been in the Oriental Seminary for several years. After filtration, the melted fats yielded the following values and constants: Spec. grav. No. 1, at 15° C. = 0.9288, at 100° C. = 0.8606; acid number, No. 1, = 11.6, No. 2 = 20.7; saponification number, No. 1, = 186.6, No. 2 = 191.7; iodine number (W), No. 1 = 41.0, No. 2 = 38.7; unsaponfiable, No. 1, = 1.21 per cent.; No. 2, = 0.49 per cent.; melting point, = 42°; at 39° small crystals make their appearance, and the fat remains liquid until 29.5° is reached, but on congealing, the temperature rises to 36°. The iodine number of the fatty acids, in the case of No. 1, is 42.1; their melting point, 62.5; the congealing point of the acids from No. 1 = 61.4°, from No. 2, 61.6°. If obtainable in quantities and cheaply, Mkani fat would answer excellently as a material for candles. One of the principal constituents of this fat is oleo-distearin, a glyceride combining 2 of stearin with 1 of olein.—Apoth. Ztg., May 24, 1899, 303; from Tropenpflanzer, 1899, 203.

Gamboge—Adulteration.—J. F. Woolsey notes a gross adulteration of powdered gamboge recently observed by him. The color was more of a dull ochre than the bright orange of good gamboge, and the sample yielded only about 40 per cent. of its weight to 95 per cent. alcohol, leaving over 50 per cent. of residue composed of amylaceous matter, either starch or flour.—Amer. Journ. Pharm., Sept., 1898, 446.

AURANTIACEÆ.

Orange Peel—Yield of B. P. Quality from Fresh Seville Oranges.—The new British Pharmacopœia, requiring that the official tincture of orange be made from the peel of fresh oranges deprived of the white portion, Harold Wyatt, Jr., ascertained the relative proportion of peel, white of peel and juice from two lots of Seville oranges. No. 1 were prime oranges; No. 2 were good as to peel, but woolly internally. The results are shown in the following:

No.	Number of oranges.	Total weight of fruit	Total weight of peel officially prepared.	Total weight of white portion.	Total yield of juice.
1	16	81½ ozs.	21½ ozs.	11½ ozs.	18 fl. ozs.
2	22	88 ozs.	22 ozs.	13½ ozs.	12 fl. ozs.

Tested by the official process for preparing.

Tinctura Aurantii, B. P., 1898.—20 oz. of peel No. 1 with 8 ozs. of 90 per cent alcohol, yielded to expression 91 fl. ozs. of tincture, while the same quantities of material, using peel No. 2, yielded only 89 fl. ozs. These tinctures differed but slightly in color, and when diluted with water were of the same aroma, but No. 2 was more bitter to the taste than No. 1.—Pharm. Journ., April 1, 1899, 308.

VITACEÆ.

Grapes—Causes of Seedlessness.—Müller attributes the absence of seeds in many varieties of grapes to two causes—functional inefficiency of the pollen and of the ovule. In some varieties the pollen grains are well developed, but either the pollen-tubes do not reach the ovules, or the ovules are incapable of impregnation. The sultana raisins and the currants of commerce belong to this class. In other varieties, while the ovules are perfect, the pollen grains are functionally defective; either the pollen-tubes do not germinate on the stigma, or they are incapable of impregnating the ovules. Seedless grapes are smaller than those containing seeds.—Landwirthsch. Jahrb. d. Schweiz., 1898—Pharm. Journ., June 24, 1899, 565.

Southwest African Raisins and Wine—Chemical Examination.—Dr. H. Thoms has examined raisins and wines produced in German Colonies of Southwestern Africa. The raisins had a pure sweet taste, and were comparable with the best commercial sorts in point of appearance and quality. They contained a very high percentage of sugar, namely, 58.7 per cent, with 20.04 per cent of water and 1.64 per cent of ash. The wines, which were of the vintage of 1897, were somewhat rough, and are evidently too young. The composition of the two sorts examined did not differ very materially—it suffices, therefore, to give that of one of them, designated as "green seal:" Specific gravity, 0.9951; free acids, calcu-

lated as tartaric, 0.46875; volatile acids, 0.02; alcohol, 10.43 (vol. per cent.); extract, 2.12 per cent; ash, 0.290; phosphoric acid, 0.01974; glycerin, 0.49; total tartaric acid, 0.2925; potassium bitartrate, 0.3713 per cent. These wines contained neither free tartaric acid nor sugar.—Apoth. Ztg., Jan. 14, 1898, 26; from Tropenpflanzer, Jan., 1899.

Wines—Composition of Different Sorts Used in Medicine.——In the course of his report on the wines desirable for preparing the official *medicated wines* (which see under "Pharmacy") Dr. M. Holz communicates the results of the examination, by the so-called "Imperial Method," of four wines commonly used by the pharmacists of Germany for making various galenical preparations. These results are as follows:

Kind of Wine.	Sherry.	Marsala.	White Port.	Malaga.
Spec. Grav. of the Wine	0.9956	1.0060	1.0112	1.0478
Spec. Grav. of the Distillate	0.9778	0.9785	0.9798	0.9793
100 Cc. of the Wine Contains:	*Gm.*	*Gm.*	*Gm.*	*Gm.*
Alcohol	14.55	140.0	12.97	13.36
Extract	4.60	7.11	8.12	17.77
Acid	0.318	0.561	0.528	0.381
Ash	0.304	0.286	0.220	0.396
Sulphuric Acid	0.1105	0.0903	0.0398	0.047
Potassium Sulphate	0.2403	0.1965	0.0865	0.103
Phosphoric Acid	0.0186	0.0242	0.0183	0.0137
Sugar	2.39	3.89	5.48	13.28
Extract freed from Sugar	2.21	3.22	2.64	4.49
Glycerin	0.46	0.68	0.34	0.50
$\frac{N}{10}$ HCl. required to neutralize the Ash	15.4	16.6	18.8	42.0
Polarization—direct	—0.9	—1.56	—1.8	—4.73
Polarization—after inversion	—0.9	—1.55	—1.8	—4.7

The Commission express the opinion that the *Sherry* is admixed with Vino blanco, the *Marsala* probably also, the *Malaga* contains too much sugar, and the *White Port Wine* appears to be the only one suitable for making the galenical preparations of the German Pharmacopœia.—Apoth. Ztg., June 7, 1899, 341.

Wines—Test for Artificial Decoloration.—A. Bimm finds that a solution of diphenylamine sulphate affords a means of detecting artificial white wines, which have been produced by decolorizing normally red wines by means of animal charcoal. Two Cc. of the test solution are placed in a small porcelain capsule, so as to give a layer of liquid 4 or 5 Mm. deep; 6 drops of wine are allowed to run down the sides, when, if the wine has been treated with animal charcoal, a marked blue ring is formed. Natural white wines will not give this reaction. The reaction appears to be due to nitrates introduced by the animal charcoal, the test liquid used being, as is well known, used for their detection. The author

has convinced himself that the washings obtained from commercial charcoal with water will give the characteristic reaction for nitrates with all the usual reagents.—Pharm. Journ., Aug. 6, 1898, 118; from Journ. de Pharm. et de Chim., (6) viii., 9.

Wines—Presence of Boric Acid.—P. Carles has found boric acid in notable quantities in many wines, more frequently in white than in red wines. He accounts for its presence in the use of clarifying agents—such as gelatin or isinglass—which tend to putrefy unless an antiferment is present. Another reason for its presence is the demand for sweet, white wines, hence its addition in order to check fermentation at a certain stage in the process. From a hygienic point of view, it is an open question whether boric acid is permissible in articles intended for human consumption.—Pharm. Journ., July 23, 1898, 73; from Rép. de Pharm., 1898, 256.

ERYTHROXYLACEÆ.

Coca—Distinctions between Bolivian, Peruvian and Brazilian Leaves.—Dr. Albert Schneider contributes the results of a study of coca leaves, covering the history, cultivation and varieties of leaves found in commerce, and particularly the histological characters by which they may be distinguished from each other. The two varieties of leaves that are principally imported into the United States are the Peruvian, or Truxillo, and the Bolivian, or Huanuco, coca. In an appendix the author also includes a study of the histological characters of Brazilian coca, which, although not known as a variety of the market, may occur more frequently than is generally supposed. While the gross differences between the three varieties of leaves—as shown in excellent cuts accompanying the paper—are quite marked, it is practically impossible to distinguish the powders of the Bolivian and Peruvian varieties from each other. The powder of the Brazilian coca may, however, be recognized by the prominent globose papillæ on the cells of the lower epidermis.—Western Drug., Dec., 1898, 540–541.

PAPAVERACEÆ.

Poppy—Cultivation in Switzerland During the Stone Age.—Dr. Hartwich communicates the results of his work on poppy products found in the houses of the Swiss lake-dwellers. As is well known, during the Stone Age, Switzerland was in places occupied by a race which lived in dwellings built on piles above the water, and in these now submerged houses have been found many products now in use. Probably of all medicinal plants now in use, the poppy can be traced further back into prehistoric times than any other. Whether the poppy was used as a narcotic at that early time or not is not to be definitely decided, but the use of other narcotics before the Stone Age is known. Since many other sources of oil were abundantly at hand, tilia, corylus, fagus, linum, etc., it is hardly probable

that the poppy was used for this product alone, and the only other reason for its culture would be its use as a narcotic. It was cultivated in Switzerland and not imported from the Mediterranean lands. Concerning the question whether the poppy of the lake-dwellers came from the original form of the poppy, papaver setigerum, or from one of the known culture forms, Dr. Hartwich concludes that it is very near the former, but still showing effects derived from cultivation. The seeds are small and contain no calcium oxalate cells among the epidermal cells. The pods are small and correspond in form more nearly to the original form than to any cultivated variety. With cultivation, the poppy loses more and more its original form. The seeds become larger and lighter colored, and calcium oxalate comes to be formed in the epidermal cells. The capsules also increase in size, and no longer dehisce as do those of the original form. By reason of the degeneration of the placentæ, the capsules assume the form of a hollow sphere; in papaver setigerum the capsules possess strongly developed placentæ and hence appear many-chambered. Likewise cultivation changes the number and form of the stigma rays. From a botanical study of material from the lake-dwellers' houses, Hartwich concludes that more than four thousand years ago, the poppy was cultivated in Switzerland and was perhaps used as a narcotic.—Pharm. Review, Jan., 1899, 18; from Pharm. Ztg., *43*, 684.

Bulgarian Opium—Culture and Composition.—Prof. C. Hartwich communicates an interesting description of the poppy culture and collection and preparation of opium in Bulgaria, where it seems to be a regular product both to the north and south of the Balkan Mountains. The carefully collected opium is thoroughly kneaded with the addition of some alcohol, formed into cakes resembling the opium from Asia Minor in shape and weight, and enveloped in poppy leaves to dry. According to his informant, Geo. Toppon, an apothecary of Plevna, the cultivation is very lucrative, but its extent is not known. Two samples analyzed by Prof. Hartwich yielded 13.15 and 11.9 per cent of water, and 6.6 and 18.88 per cent of morphine respectively, and both were free from starch. —Schw. Wochensch. f. Pharm., 1899, 121.

BIXACEAE.

Bixa Orellana—Proximate Constituents.—The leaves of *Bixa orellana* having long been used with success in the hospital of Paramaribo to allay vomiting, an examination of the infusion—the form in which the leaves are used—for alkaloid was undertaken some years ago, but without success. Surie has now extended the investigation to the search for a glucosidal active constituent. An infusion of the dried leaves was treated with lead acetate, the excess of lead removed with sulphuretted hydrogen, the filtrate evaporated to the consistence of extract, and dried completely in an desiccator. One-half of the dry substance so obtained was mixed with

talcum, and exhausted in an extraction apparatus with chloroform; the other half was exhausted in the same way with absolute alcohol. From the alcoholic solution he succeeded in separating a bitter, white substance, which was hydrolyzed readily by dilute hydrochloric acid with formation of a reducing sugar. The chloroform extraction, when evaporated, the residue dissolved in a little absolute alcohol, and the solution mixed with water yielded a white, tasteless precipitate of a body which could not be hydrolyzed with hydrochloric acid. The watery portion resulting from this second experiment yielded to chloroform a bitter substance which is evidently identical with the glucoside obtained from the alcoholic extraction in the first experiment.—Apoth. Ztg., Jan. 18, 1899, 35: from Nederl. Tijdschr. voor Pharm., Nov., 1898.

FRANKENIACEÆ.

Yerba Reuma—Proximate Analysis.—Having his attention attracted to "yerba reuma" by a deposit of abundant crystals in an old fluid extract, which, though yellow in color, proved to be pure and simple sodium chloride, Lyman F. Kebler undertook a proximate examination of the drug, which, as is known, is derived from

Frankenia grandiflora, Cham. and Schlecht., abounding near the sea shore from San Francisco to San Diego, in the deserts of Arizona, Texas, and Southern Nevada, and commonly known either under the above name, or as *Salt Grass*. The latter name is doubtless justified, since some selected material yielded 12.54 per cent. of sodium chloride; the ash, with chlorides, amounting to 23.04 per cent.; the moisture, determined at 115° C., to 10.93 per cent. There appears to be considerable variation in this respect, other samples containing as high as 17.75 per cent. of sodium chloride and a total ash amounting to 34.12 per cent.—both remarkably high figures in plant analyses. The remaining results on a sample, dried at 115°, were as follows: Petroleum ether extract (wax, saponifiable fat, chlorophyl, etc.), 0.72 per cent.; ether extract (wax, saponifiable fat, chlorophyl, etc.), 1.00 per cent.; absolute alcohol extract (tannin, 2.92 per cent.; extractive, 1.90 per cent.), 4.82 per cent.; water extract (sodium chloride, 17.42 per cent.; extractive, 20.00 per cent.) 37.42 per cent.; sodium hydroxide (0.2 per cent.) extract, 4.71 per cent.; hydrochloric acid (1 per cent.) extract, 3.66 per cent.; ash in plant residue, 5.03 per cent.; cellulose, lignin and allied substances, 34.93 per cent.; loss and undetermined, 8.43 per cent. The medicinal value of this plant lies in the salt and tannin it contains.—Amer. Journ. Pharm., Jan., 1899, 23–25.

ILLECEBREÆ.

Lignaloe Wood—Two Commercial Varieties.—According to the investigations of Moeller, there are two varieties of lignalœ wood, one derived from a species of *aquillaria*, and the other from a *gonostylus*, the latter being a very hard wood, while the *aquillaria* produces a soft wood.

Characteristic features of the *aquillaria* wood are the intra-axillary phloem bundles, which enable the determination of identity of the smallest fragments under the microscope. These are entirely absent in the wood from *gonostylus*. The author calls attention to spurious lignalœ wood, which is of various origin—from leguminous, apocynaceous plants, but never from *excoccaria*, *ficus*, *dalbergia*, or *juniperus*, as is commonly supposed. Numerous resinous woods are also sold as lignalœ wood, but have not been identified.—Pharm. Centralh., March 9, 1899, 153.

SAXIFRAGACEÆ.

Hydrangea Paniculata, var. Grandiflora — Proximate Examination of the Root—August G. Suebert has subjected the root of *hydrangea paniculata*, var. *grandiflora* to proximate examination by Dragendorff's method, with results as follows: Petroleum ether extract (wax, saponifiable fat, caoutchouc), 1.20 per cent.; ether extract (containing a crystalline, glucosidal principle, soluble in water, and a crystalline principle insoluble in alcohol, resembling but apparently not identical with the *hydrangin* found by Bondurant in *hydrangea arborescens*, and for which the name *para-hydrangin* is proposed), 2.39 per cent.; absolute alcohol extract (containing 2.38 per cent. of glucose and 0.7 per cent. of saccharose), 14.49 per cent.; water extract (containing 2.42 per cent. mucilage, and a trace of dextrin), 3.60 per cent.; dilute alkali extract (mucilage 7.30 per cent.), 15.88 per cent.; dilute hydrochloric acid extract (2.37 per cent. pararabin), 4.88 per cent.; starch, 9.46 per cent.; moisture, 7.94 per cent.; ash, 8.12 per cent.; cellulose, lignin and undetermined residue, 32.04 per cent. The percentages are all based on the air-dry material.—Amer. Jour. Pharm., Nov. 1898, 550–552.

HAMAMELIACEÆ.

Hamamelis virginica, L.—Proximate Constituents of the Bark.—Grüttner, after giving a morphological and anatomical description of the bark of *hamamelis virginica*, L., communicates the results of the chemical examination. Ether extracted 0.74 per cent. of a dark green fat, thick-liquid at ordinary temperature, neutral, and composed principally of the ester of a monatomic alcohol of the formula $C_{26}H_{44}+H_2O$. It contained also phytosterin, m. p. 137, and small quantities of tri-glycerides. Furthermore, it contained oleic and palmitic acid, and insignificant quantities of a fatty acid richer in carbon than these. The ether also extracted some wax. From the bark, after extraction with ether, a crystallized tannin was extracted by ether-alcohol. When purified by fractional precipitation with lead, it had the composition corresponding to the formula $C_{14}H_{14}O_9+5H_2O$ (or $5\frac{1}{2}H_2O$). Under certain conditions of the experiment, this "hamamelitannin" is obtained only in an amorphous condition, together with a "glucosidal tannin." Both "hamamelitannin" and the

"glucosidal tannin" are gallic acid derivatives. The sugar of hamamelis bark is a glucose.—Arch. d. Pharm., 1898, 288; Apoth. Ztg., Sept. 10, 1898, 637.

CACTACEÆ.

Mescal Buttons—Pharmacology of Alkaloidal Constituents.—By a method modified from Hefften, Edmund White prepared from the so-called "mescal buttons" (*anhalonium lewinii*) four alkaloids, the pharmacology of which has been studied by Dr. W. E. Dixon. The alkaloids and the percentage obtained were as follows: *mescaline* and *anhalonidine*, together 1.16 per cent; *anhalonine*, 0.46 per cent; *lophophorine*, 0.13 per cent. All were found to be freely soluble in water, and to possess remarkable similarity in their physiological actions. They proved to be absolutely non-irritant when applied to the skin; hence injections were deemed to be a suitable mode of administration. A 5 per cent solution of any of them has no effect when applied direct to the conjunctiva. In the mouth the substances behave as specific sialogogues. After large doses nausea or vomiting may occur. Small doses are apt to cause constipation, while when the dose is large, diarrhœa sometimes occurs, and in exceptional cases even bloody stools have been observed. These results occur whether the alkaloids are given by injection or by the mouth. The important effects of the alkaloids in therapeutic doses are summarized by Dr. Dixon as follows: 1, a direct stimulation of the intracardiac ganglia; 2, an initial slowing of the heart; 3, an elevation of arterial tension; and 4, a direct stimulation of the brain and motor centers of the cord.—Pharm. Journ., Oct. 29, 1898, 457; from British Medical Journal, 1971, 1060.

CUCURBITACEÆ.

Colocynth—Color of the Ripe Fruit.—The "Garden" (Nov. 26, 439) calls attention to the fruiting recently of a specimen of citrullus colocynthis in one of the houses in Kew Gardens. The fruits are about as large again as an ordinary orange, and are of a rich golden color, which is apparently assumed when the fruit ripens, since fresh fruits from Mogador, brought on some years ago by the late Dr. Learedo, had a green color variegated with white.—Pharm. Journ., Dec. 3, 1898, 583.

Telfairia Pedata, Hooker—Percentage and Characters of the Fixed Oil of the Seeds.—H. Thoms has made a chemical investigation of the seeds of *telfairia pedata*, Hook., with particular reference to the fixed oil, which appears to offer an efficient East African substitute for olive oil. The seeds as supplied for examination are composed of about 60 per cent. of kernel and 32.94 per cent. of shell, covered by about 7.06 per cent. of closely meshed bark-fibre. The kernel loses about 3.95 per cent. of its weight when dried at 105° C., and yields to ether, by extraction in a Soxhlet apparatus, 64.71 per cent. of fixed oil, which, calculated for the

entire seed, amounts to 33 per cent. This result agrees well with the results obtained by Dr. H. Gilbert in 1891, viz., 59.31 per cent. for the kernel (not dried ? Rep.), and 36.2 per cent. for the entire seed—the other constituents of the seed determined by Dr. Gilbert being: Water, 6.56 per cent.; ash, 2.04 per cent.; proteids, 19.63; wood fibre, 7.30; non-nitrogenous constituents, 28.45 per cent. The oil extracted by ether containing some coloring matter and bitter principle, some oil was prepared for the examination of the constants by simple expression, the yield being 43.5 per cent. So obtained it had at first the color of linseed oil, but bleached after a few days, acquiring a light yellow color, pleasant odor, and bland taste, a flocculent precipitate of glycerides being formed during this change. The constants of telfairia oil were determined to be as follows: Sp. gr.=0.918 at 15° C.; acid number=0.34; saponification number=174.8; ester number=174.46; iodine number=86.2; congealing point = + 7° C. Melting point of the fatty acids separated from the oil=44° C.; congealing point of the same=41° C. Like olive oil, telfairia oil belongs to the non-drying oils, and gives the elaïdin reaction with fuming nitric acid. It differs from olive oil, however, not alone in some of its important constants, but also in that it congeals at a considerably higher temperature, this being doubtless due to large percentages of stearic or palmitic acids and doubtless interfering with its use as food. On the other hand telfairia oil will probably become an important product for the manufacture of soap, and particularly of candles. The examination of the bitter principle, and of a yellow coloring matter contained in the shells, will be undertaken and reported on in the near future.—Apoth. Ztg., Nov. 26, 1898, 829.

ONAGRACEÆ.

Trapa Natans—Proximate Constituents of the Seeds.—In 1861 Gorup-Besanez found in the ash of the shells of the "water nut"—*trapan atans*—68.063 per cent. of iron, the shells having for a long time been submerged in water, and their kernel-content completely washed away. Thomas has confirmed this high percentage of iron, and ascribes it to iron introduced by the water by combination with the tannic acid of the shells, and therefore not as a normal constituent. This view is now supported by the evidence of a comprehensive analysis of fresh, well-ripened nuts by P. Neumann. He finds the relation of shell to kernel to be as 1 : 1.088. The shells contained 12.42 per cent. of water, and yielded 3.15 per cent. of ash, containing 2.45 per cent. of iron. The kernels contained 10.41 per cent. water, 2.78 per cent. ash, 0.73 per cent. fat, 1.38 per cent. cellulose, 19.93 per cent. protein bodies, 3.22 per cent. dextrose, 52.19 per cent. starch, and 9.36 per cent. of other non-nitrogenons bodies, the exact nature of which has not been determined. This composition would indicate considerable value as a food product. The nuts may be eaten raw or roasted, and have a pleasant taste, reminding of chestnuts. The plant is

easily cultivated in lakes and ponds that are not too deep.—Chem. Ztg., 1899, Nos. 3 and 4, Apoth. Ztg., Mar. 8, 1899, 121.

MYRTACEÆ.

Eucalyptus—New Species—R. T. Baker has described and figured in the "Proceedings of the Linnæan Society of New South Wales" (Sept. 28, 1898, pt. 3), two new species of eucalyptus allied to *E. obliqua*, which he has named *E. dextropinea* and *E. lævopinea*.

E. dextropinea has a fibrous, persistent bark and inferior timber of a dark brown color. The volatile oil, which is obtained (from the leaves [?], Rep.) to the amount of 0.85 per cent., consists largely of a dextrorotatory pinene, chemically the same as that obtained from *coniferæ*, eucalyptol being entirely absent. The second species,

E. lævopinea, has a less fibrous, but brittle bark, and a very hard, close-grained, pale brown timber. The volatile oil, of which 0.66 per cent. is yielded, consists largely of lævo-rotatory pinene, chemically identical with that obtained from the *coniferæ*, but contains neither eudesmol nor eucalyptol. Both species yield a ruby kino, consisting principally of tannin and water, and devoid of gum, eudesmin, and aromadendrin.—Pharm. Journ., Feb. 11, 1899, 119.

Gummi Eucalypti Rostratæ—Advisability of Confining the Official (B.P.) Eucalyptus Gum to this Species.—The question of limiting the eucalyptus gum to the gum of *eucalyptus rostrata*—the so-called "red-gum" of the market—having engaged the attention of the Pharmacopœia Committee on the proposed Indian and Colonial Addendum to the British Pharmacopœia, W. J. Brownscombe, who had for many years been associated with the late Mr. Joseph Bosito in the investigation of the eucalyptus and other Australian vegetation, expresses it as his opinion that the kino of the *E. rostrata* is superior as a therapeutic agent to any of the kinos of the other eucalypti, and, moreover, that it is simply its own merit that has won it the place it holds in medical estimation to-day. The advantage of limiting the "eucalyptus gum" to the product of *E. rostrata* is exactly analagous to limiting kino to that of *pterocarpus marsupium* and catechu to that of *uncaria gambir*. In fact, under the definition of the Brititish Pharmacopœia, it is not likely that any other eucalyptus gum than that from *E. rostrata* is likely to find a place in drug circles for many years to come; at least, not while the red-gum forests of the Colonies are available for the collection of this article—the reverse being a very remote contingency. Notwithstanding that exception has been taken to the term gum as applied to this product, it is so universally known as "red gum," or "eucalyptus red gum," that the author considers it advisable to retain it. He suggests, therefore, that the official title of the gum be changed to eucalyptus red gum, that *eucalyptus rostrata* be designated as the sole source of the gum, and the solubility requirement be altered from 80 to

90 per cent., as at present, to 90 to 95 per cent. in cold water or alcohol, since there is no difficulty to find specimens of red gum that will dissolve in the cold to the extent of 95 to 98 per cent. As in the case of kino and catechu, an astringency test should also be given; it should require 27 to 28 parts of isinglass to precipitate all the astringent matter in 100 parts of red gum.—Pharm. Journ., May 25, 1899, 276.

Eucalyptus Loxophleba—Characters of Volatile Oil.—Having his attention drawn to the overpowering and not altogether pleasant odor of the bruised leaves of some of the Western Australian eucalypti, E. J. Parry secured about 70 Cc. of the distilled oil of one of them, *eucalyptus loxophleba*, and has subjected it to such examination as the limited supply permitted. The oil has a most obnoxious and uninviting odor, and when inhaled induces violent coughing. Its specific gravity at 15.5° is 0.8828; it is faintly dextro-rotatory, and yielded the following fractions: 68 per cent at 168°–171°; 11 per cent at 171°–176°; 8 per cent at 176°–182°; 2 per cent at 182°–187°; residue, 8 per cent. The first fraction was almost free from cineol, whereas the 8 per cent. fraction was almost entirely cineol, and it was estimated that the total amount of cineol present in the oil amounted to about 15 per cent, but certainly not more than 20 per cent. Whilst phellandrene was present, as identified by its nitrite, it did not form anything like the remaining 80 per cent of the oil. The presence of aldehydes and ketones was indicated by an absorption by sodium bisulphite.—Proc. Brit. Phar. Conf., 1898, 345–347.

Eucalyptus—Therapeutic Value of the Oils of Different Species.—The statements of Dr. Benjafield that oils distilled from other species of *eucalyptus* than *E. globulus* are comparatively useless, is, so W. J. Brownscombe contends, utterly without foundation in fact, since other oils on the market from other species frequently answer the tests of the new British Pharmacopœia even more closely than the oil of *E. globulus*, and contain in some cases a large percentage of eucalyptol. Indeed, certain oils from *E. globulus* will not respond to all the official tests, and are therefore as certainly excluded by the Pharmacopœia requirements as the oils of other species Considering the widely different sources from which the oil is obtained, and the consequent variations of season, soil, and climate—which have apparently been ignored by the Pharmacopœia Committee—it is little wonder that there should be variations in the product of one and the same species of *eucalyptus*.—Pharm. Journ., Mar. 11, 1899, 227; from Lancet, 3940, 632.

Stringybark Trees—Value of Essential Oils in Eucalyptol.—R. T. Baker and H. G. Smith find that the trees belonging to the genus *eucalyptus*, and classified by Baron von Mueller under the name of "Stringybark," yield an oil which, though having a specific gravity less than 0.910, contains over 50 per cent. of eucalyptol, and answers all the tests of the British Pharmacopœia, except that dealing with specific gravity. The au-

thors also find that the phosphoric acid test is not a satisfactory qualitative one for eucalyptol in some crude eucalyptus oils, and that *eudesmol*, the stearopten of eucalyptus oil, exists in large quantities in the oil of *E. macrorhyncha*, and can be readily purified.—Pharm. Journ., Dec. 17, 1898, 635; from Proc. Roy. Soc. N. S. Wales.

Cloves—Method of Drying in Zanzibar.—The endeavor was made during the past year to dry cloves by artificial aids, but appears to have been unsuccessful, principally because the cloves become too dry and lose their elasticity. The method pursued in Zanzibar, according to "The Shambo," consists in simply spreading out the cloves in the morning and gathering them in at night, the operation being conducted in close proximity to the storehouses so that they may be conveniently brought under cover in case of rain. It is of no importance whether this operation of drying requires two hours or four days for completion. What is essential, is that the flower-buds are plucked singly and at the right time. Heretofore, too little attention has been paid to this, in consequence of which the product has been very variable, being composed of over-ripe, ripe and unripe buds. The over-ripe buds become shriveled on drying; in the unripe ones the head has not yet become formed; hence the inferiority in value of Zanzibar and Pemba cloves, no matter how carefully dried they may have been. —Apoth. Ztg., Dec. 3, 1898, 849; from Tropenpflanzer, ii., 1898, No. 8.

ROSACEÆ.

Gillenia Trifoliata—Origin of its Generic Name.—A very interesting review of the controversies and probable origin of the generic name of *gillenia trifoliata*, Moench, is published in "Meehan's Monthly" (1898, p. 117), which is intended as a contribution to the history of this plant. The plant has been known in Europe since 1680, when specimens were sent from America by the Rev. John Banister under the name of *spiræa trifoliata*. It was subsequently also known as *ulmaria virginiana trifoliata*, but continued as *spiræa* until, in 1802, Conrad Moench, a professor at the University of Marburg, named the plant Gillenia trifoliata, it is presumed in honor of an obscure botanist, or, as seems more probable, in honor of a gardener by the name of A. Gille, or Gillenius, in whose garden he had the opportunity of studying this among other rare plants. Its common name, "Indian physic," refers to its use among the Indians, which was chiefly as an emetic. The paper is illustrated by a handsome full page photogravure showing a portion of a flowering stem of *gillenia trifoliata*, from a plant growing on the Wissahickon, near Philadelphia. When growing in large masses, as is occasionally found, it does not present the same pretty effect as when individual plants are growing among sedge grasses, ferns and other green vegetables. The light color of the flowers, amidst so much verdure, then shows to great advantage, and this is the condition in which it is generally found. It occurs sparingly west of the

Alleghenies, its home being New York and Pennsylvania, thence to Virginia, and rarely to North Alabama, its southern limit.—Amer. Journ. Pharm., Oct., 1898, 501–505.

Calliandra Grandiflora—Active Constituent and Medical Properties of the Root.—The root of *calliandra grandiflora*, a shrub indigenous to Mexico and Brazil, and known by the names Tlacoxilochitl, Pambotano, Timbrills, Cabellitos, Tepachera, and Xilonochitl, has a local reputation as an antiperiodic. Recent investigation by Altamirans proves the active principle to be a glucoside, *calliandrin*, which appears to be a saponin, and according to Duyk, is toxic in large doses, and also in much smaller quantities when administered by hypodermic injection. Internally it acts as an irritant and emetic. The root is used in the fermentation of "tepache." —Pharm. Journ., April 15, 1899, 535; from Bull. Comm., 27, 81.

LEGUMINOSÆ.

Gums—Varieties Produced in the French Colonies.—Bocquillon enumerates and briefly describes the gums, and some gum resins, which are produced in the French Colonies, as follows:

1. *Gums, soluble in water.*

Senegal Gum, the official gum, in West Africa and Tahiti.

Gum of Acacia Dealbata, a substitute for gum arabic, from Réunion.

Gum of Acacia Lebbeck, also a substitute for gum arabic, from Réunion. This variety has a dark color, which Bourguelot and Bertrand attribute to the action of an oxidizing ferment upon a tannin contained in the plant, which becomes active particularly during the rainy season.

Gum of Melia Azedarach, from Réunion, and also from Guadeloupe and other French West Indian possessions, is composed exclusively of arabin. It is used in the colonies as a stimulant.

Gum of Anacardium occidentale, from French-Guiana, Guadeloupe and Martinique, cultivated also in Madagascar, contains some bassorin, and is more or less colored according to the period of collection—during the dry or rainy season.

Gum of Cedrela Odorata, originally from Senegal, is cultivated in Guadeloupe. It is composed almost entirely of arabin, with insignificant quantities of bassorin.

Gum of Feronia Elephantum, pure gum arabic, indigenous to the French-Indian possessions.

Gum of Anogeinus latifolius—"Gum Dhaura"—from French India, identical with gum arabic, but strongly colored.

2. *Gums, swelling in water, and insoluble or partially soluble in water.*

Gum of Semicarpus Anacardium, from Cochin China, French India, New Caledonia and Réunion, is practically insoluble in water, containing 96 per cent. of bassorin and 4 per cent. of arabin, but is easily soluble in oil of turpentine, while alcohol dissolves 11 per cent. and ether 6 per cent.

Gum of Moringa pterigostigma—"Gum Shega"—from Réunion and India, contains much bassorin, a little arabin, and less dextrin. It is used in the French colonies as an antidysenteric and—in large doses—as an abortive.

Gum of Cochlospermum Gossypium—"Gum Kuteera"—is found in the French-Indian possessions. It is insoluble in water, containing bassorin, cerasin, and meta-arabic acid.

Gum of Arabia (? Rep.), from New Caledonia, swells in water, without dissolving. It contains 79 per cent. arabin, 21 per cent. bassorin (? Rep.).

Gum of Cocos Nurifera, from Tahiti, contains oil of bassorin.

Gum of Odina pinnata, from (French ? Rep.) India, is partially soluble in water. It contains 89 per cent. arabin and 11 per cent. bassorin (? Rep.).

3. *Gum Resins.*—These are included here for convenience.

Gum-resin of Araucaria Cookii, occurs abundantly in New Caledonia. It contains 1 to 2 per cent. of volatile oil, 25 to 40 per cent. of gum and 74–58 per cent. of resin.

Gum-resin of Garcinia Collina—"Mou"—is derived from New Caledonia, and has purgative properties.

Gum-resin of Garcina Morella, from Cochin China, in the official gamboge.—Apoth. Ztg., May 27, 1899, 312; from Rep. de Pharm., 1899, 194.

Kino—Influence of Method of Preparation on its Quality.—W. W. Will and G. T. Branch have examined specimens of kino from *pterocarpus marsupium*, which had been prepared in various ways, and find that great differences exist according to the method pursued. Artificial heat and sun's heat give products that agree very closely in quality, but it is a distinct disadvantage to boil the juice prior to drying. The observations of the authors are summarized as follows:

No. 1. After collection the juice was boiled and then dried, several weeks being required by the latter process. The resulting kino appeared in small angular pieces, brittle and dull reddish-brown in color. It was found to contain 39.3 per cent. tannin and yielded 1.3 per cent. of ash.

No. 2. After collection the juice was dried in vessels heated by steam, but about four hours being consumed by this process. The kino was made up of small, angular pieces, very brittle, light reddish-brown in color, with clear, bright surface and transparent edges. Tannin content, 49.17 per cent.; ash, 1.1 per cent.

No. 3. After collection the juice was spread in layers and exposed to the sun, drying in about twelve hours. The kino consisted of small, angular pieces, regular and even in size, in reddish-black brittle fragments; surface very bright. This kino contained 49.76 per cent. tannin and 1.0 per cent. ash.

No. 4. The juice was spread in layers one-fourth inch thick and dried in the shade, twenty-four hours being consumed in so doing. This kino consisted of thin, flat laminæ, clear and transparent, with brilliant red color; the thicker fragments being perfectly transparent at the edges. Tannin content, 45.29 per cent.; ash, 1.3 per cent.

No. 5. Malabar kino derived from unboiled juice. Kino in small angular fragments and thin laminæ, clear and transparent, with bright, ruby-red color. Tannin content, 55.13 per cent.; ash, 0.8 per cent.

No. 6. Malabar kino obtained from boiled juice. Kino in angular fragments, very variable in size, dull, dark brown in color. Tannin content, 41.12 per cent; ash, 0 7 per cent.

A kino from *pterocarpus erinaceus* gave 56.2 per cent. of tannin.—Pharm. Review, Nov., 1898, 427; from Chem. and Drug., *53*, 56.

East African Kino—Description.—Thoms describes an East African sort of kino, from Kilona, which is derived from

Pterocarpus erinaceus, a tree known locally by the name "Mniga," and "Miniga." It occurs in small, very brittle, angular pieces of a dark-red color. In these splinters it is clear and transparent. It is completely soluble in 4 parts of hot water, forming an astringent solution of acid reaction. It is moderately soluble in alcohol, and gives the reactions that are characteristic, as are its physical properties, with genuine kino. In fact, the small percentage of ash—pure white, 0.78 per cent.—establishes it as being a purer article than ordinary good kino, which, according to Flückiger, contains about 6 per cent. of ash.—Apoth. Ztg., March 8, 1899, 121.

Kino—Solubility in Water.—Ezra J. Ware calls attention to the statement in the U. S. Pharm., 1890, that kino is "only slightly soluble in water." This is not alone contradicted in other works of reference, but also by his own experience. Using the best obtainable kino he finds it to be completely soluble in cold water in a reasonably short time. He is not positive that the kino examined by him is that derived from *pterocarpus marsupium*, the official article; but even this kind is stated by other authorities to be easily soluble in cold water and alcohol.—Bull. Pharm., May, 1899, 191.

Copaifera Langsdorffii—Correct Spelling of the Specific Name.—Dr. Charles Rice calls attention to the incorrect spelling of the specific name *Lansdorffii* which, doubtless through an error of Desfontaines (1821), has been accepted by various authorities and so has been accepted by Bentley and Triemen, and found its way into the new index. The mistake was pointed out long ago, in the Pharmaceutical Journal (1879) and also in Pharmacographia (2d edition). Some of the botanical authors who happened to know better corrected the mistake without making any remarks. Thus, for instance, Baillon has it right in all his works, for instance in

Histoire des Plantes, II, 163; also, Rosenthal in his Synopsis Plantarum Diaphoricarum, p. 1046, etc. They write Langsdorffii (with g and two f's). The species name is in recognition of George Heinrich Freiherr von Langsdorff, who was born on April 18, 1773, at Woellstein in Rhenish Hesse, studied medicine at Goettingen, then went to Portugal, where he remained from 1797 to 1803. He then participated in Krusenstern's Russian exploring expedition, after which he became Russian Charge d'affaires in Brazil. In 1831 he returned to Germany and died at Freiburg in the Breisgau on June 29, 1852. He wrote an account of Krusenstern's expedition, under the title: "Bewerkungen auf einer Reise um die Welt," 2 vols. Frankfort a. M., 1812.—West. Drug., Nov., 1898, 489.

Copaiba, Gurjun and Mecca Balsam—Determination of Constants.—In continuation of researches heretofore published in the "Helfenberger Annalen" (1897), Dr. K. Dieterich has investigated some of the rarer sorts of copaiba, such as Angostura, Bahia, Carthagena, Maturin, and the West African Illurin balsam, and communicates the constants obtained, together with those obtained with certain samples of Gurjun and Mecca balsam, as follows:

		Acid Number.	Ester Number.	Saponification Number.
Angostura balsam,	I.....	79.52–80.70	16.24– 17.38	95.76– 99.08
	II.....	75.87–76.32	16.07– 16.19	91.94– 92.51
	III.....	83.00–83.50	8.36– 7.94	91.36– 91.44
Bahia balsam,	I.....	64.19–64.25	1.76– 2.60	66.95– 66.85
	II.....	81.09–81.27	5.08– 6.05	86.17 87.32
Carthagena balsam,	I.....	49.00–49.10	56.20– 57.17	105.20–106.57
	II.....	62.30–62.67	41.15– 40.90	103.45–103.57
	III.....	87.75–88.23	4.55– 4.67	92.30– 92.90
Maracaibo balsam,	I.....	91.10–92.43	7.70– 6.39	98.80– 98.82
	II.....	77.16–77.30	9.85– 11.08	87.01– 88.38
	III.....	90.82–92.03	18.26– 17.59	109.08–109.62
Maturin balsam,	.....	78.52–82.73	12.86– 9.19	91.38- 92.02
Gurjun balsam,	I.....	10.80–10.98	14.00– 15.37	24.80– 26.35
	II.....	10.64–10.77	14.83– 15.00	25.47– 25.77
Para balsam,	I.....	49.47–49.92	15.15– 18.06	64.62– 67.98
	II.....	61.62–61.86	9.06– 8.89	70.68– 70.75
Illurin balsam,	.....	58.74–59.33	9.62– 9.62	68.36- 68.95
Mecca balsam,	I.....	39.84–39.96	101.10–101.39	140.94–141.35
	II.....	60.77–61.37	81.90– 82.66	142.67–144.03

—Pharm. Centralh., 1899, 311.

Piscidia Erythrina—Proximate Analysis of the Bark.—Herman Berberich has subjected Jamaica dogwood bark to proximate analysis with results as follows: Petroleum ether extract, composed of caoutchouc, saponfiable wax and fat, etc., 0.61 per cent.; ether extract, composed of glucose, saccharose, resin, *piscidia*, etc., 0.86 per cent.; absolute alcohol extract, composed of glucose, saccharose, resin, etc., 0.51 per cent.; water extract, composed of mucilaginous substances (14.78 per cent.) dextrin

(3.38 per cent.), saccharose (1.20 per cent.), etc., 22.43 per cent.; alkaline water (2 per cent. NaOH) extract, composed of mucilaginous and albuminous substances (1.28 per cent.), etc., 4.40 per cent.; acidulated water (1 per cent. HCl.) extract, composed of pararabin, 4.0 per cent.; starch, 1.34 per cent.; moisture, 9.25 per cent.; ash, 10.55 per cent.; cellulose and undetermined substances, 46.05 per cent. The substance *piscidia*, mentioned among the components of the ether extract, was so named by Edward Hart, who isolated it in 1883, and described it as being a non-glucosidal substance, crystalline, insoluble in water, slightly soluble in cold alcohol and ether, much more soluble in boiling alcohol, and easily soluble in benzene and chloroform. These crystals melted at 192° C., and had the composition required of the formula $C_{20}H_{24}O_8$. Mr. Berberich has isolated some of the substance (which is unfortunately named "piscidia," a name which is identical with the generic name of the plant, Rep.), following the method used by Mr. Hart, and found it to possess all the properties assigned to it by the latter.—Amer. Jour. Pharm., Sept., 1898, 425–427.

Alcornoco Bark—A Substitute for Jaborandi Leaves.—Prof. C. Hartwich describes a bark, received from South America, which is said to be more effective than jaborandi leaves, for which it is recommended as a substitute. It is stated to be the bark of *pilocarpus microphyllus*, but Professor Hartwich identifies it as one of the so-called "alcornoco barks," a name which signifies simply "cork-bark," and has been applied to the barks of Cæsalpinieæ, Euphorbiaceæ and Malpighiaceæ. The sample under consideration is not derived from a species of *pilocarpus*, but appears to be like the bark of a Cæsalpinieæ, namely

Bowdichia virgilioides, Kunth. The growing scarcity of jaborandi leaves of good quality makes an efficient substitute very desirable, and the high ecomiums with which this bark was introduced have led to the hope that such had been found. Its value, however, can only be determined by experiments which are now under way, and will be reported on when completed.—Schweiz. Wochensch. f. Chem. u. Pharm., 1899, 27.

Coronilla Varia—A New Cardiac Remedy.—Dr. V. Poulet has used the aqueous extract of the flowering tops and leaves of *coronilla varia* with excellent results in the treatment of cardiac affections. It possesses the great advantage over digitalis and strophanthus that it does not derange the digestive organs, though, in diuretic action, it is perhaps less energetic than digitalis. This can be easily remedied by prescribing at the same time a diuretic, such as theobromine. The dose of the extract is 10 centigrammes 3 or 4 times daily, and it can be given indefinitely, since it is not cumulative in its action.—Nouv. Rem., July 8, 1898, 289.

"Waras"—Proximate Constituents.—A. G. Perkin has determined the coloring matters of the Indian dyestuff "waras." This is a purplish powder which covers the seed pods of

Flemingia congesta, an erect, woody shrub of Africa and India, and which dyes silks a golden yellow shade. In its general properties and microscopic appearance it closely resembles kamala, with which it is closely related in tinctorial properties, but is much stronger. Mr. Perkin has isolated two crystalline constituents. The principal one is named by him

Flemingin, $C_{12}H_{12}O_3$, which constitutes an orange-red powder composed of small, prismatic needles, melting at 171°–172°, and resembling in its appearance and numerous properties the rottlerin of kamala, from which it is distinguished by its solubility in alcohol, and by the browner tint of its alkaline solutions. The second crystalline constituent, which he names

Homoflemingin, is present only in minute quantities. It forms glistening yellow needles, which melt at 164°–166°, but otherwise possesses properties resembling those of flemingin. The author has also isolated two resins, one possessing a high, the other a low melting point. The higher melting resin ($C_{12}H_{12}O_3$) is isomeric with flemingin, but dyes silk in shades which are redder than those produced by flemingin. It constitutes a brick-red powder, which forms with alkalies deep brown solutions. The lower melting resin ($C_{13}H_{14}O_3$) is a deep orange-brown, transparent mass, soluble in alkali with an orange-brown color, and closely resembling the resin of low melting point heretofore isolated by the author from kamala.—Chem. News, July 8, 1898, 20–21; from Proc. Chem. Soc.

Gogo Root—An Emetic Drug from the Philippines.—The "Pharm. Post" (Nov. 27, 1899) describes a drug introduced under the name of "gogo root" (see Proceedings, 1898, 343) from the Philippines as an emetic. It occurs in long strips of fibrous substance, about two or three feet long and 2 inches broad, which are derived from *entada scandens*. It contains saponin to the amount of 1.5 per cent., but no other alkaloid or glucoside to which its emetic properties could be attributed. The seeds, which are also emetic, contain 7 per cent. of fat.

URTICACEÆ.

Indian Hemp—Preservation.—Dr. Prain, of the Royal Botanic Gardens at Calcutta, has found that Indian hemp is best preserved in perforated boxes. Stored in this way it retains its aromatic properties for two or three years, whereas when kept in hermetically sealed containers, the water retained by the drug induces fermentation, and a strong rancid odor is developed.—Pharm. Review, Sept., 1898, 336.

CUPULIFERÆ.

Cork-wood—Constituents.—H. Thoms, referring to a preliminary notice by W. Bræutigam that he had found vanillin among the constituents of cork-wood (see *Vanillin*, under "Organic Chemistry,"), observes that he

has also noticed the occurrence of vanillin in the course of his investigation of the constituents of the cork substance, but more particularly calls attention to the crystalline body

Cerin, which is obtained in abundance and in handsomely crystallized condition from the ether extract by treatment with dilute potash solution in acetic ether, decoloration with animal charcoal, etc. It was obtained in the form of silky glistening needles, which are with great difficulty dissolved by the ordinary solvents, melt at 249° C., and have a composition approximating to the formula $C_{30}H_{50}O_2$. Its chemical relations place it among the phytosterins. Its solution in acetic anhydride gives with concentrated sulphuric acid a rose-red color, which remains unchanged during several days. When its chloroform solution is shaken with an equal volume of sulphuric acid, the chloroform assumes a yellow color, which changes to violet after several hours.—Pharm. Centralh., Sept. 29, 1898, 699–700.

CONIFERÆ.

Pinus Echinata, Miller—Proximate Analysis of Bark.—Chris. Koch, Jr., has subjected white pine bark—*pinus echinata*, Miller—to proximate analysis by Dragendorff's method. The bark was a portion of the same lot investigated by the late Prof. Trimble in 1896 (see Proceedings, 1896, 649), and was obtained from quite a young tree. The results were briefly as follows: Moisture determined at 110°, 8.55 per cent.; ash, 1.4 per cent., of which 16.07 per cent was soluble in water, 39.29 per cent. soluble in hydrochloric acid, and 44.64 per cent. consisted of siliceous matter. The *petroleum ether extract* amounted to 1.66 per cent. of the air-dried bark, and was composed of resins, saponifiable wax and a trace of volatile oil. The *ether extract*, amounting to 3.09 per cent., consisted of tannin, phlobaphenes and altered resins. The *absolute alcohol extract*, amounting to 9.03 per cent. was composed of tannin, phlobaphene and sugars. The *water extract* (2.18 per cent.), was composed of mucilaginous matter, dextrin and traces of reducing sugar. The *alkaline water extract* (5.73 per cent.) was largely composed of mucilaginous and gummy substances. The *acidulated water extract* (3.51 per cent.) contained pararabin. Other constituents were: *lignin*, 52.17 per cent.; *cellulose*, 6.14 per cent. Only traces of *volatile oil* were obtainable by distillation, the distillate having an aromatic, resin-like odor. The *tannin* was estimated separately by the hide powder method, and was found to be 10.24 per cent., belonging to the oak bark tannin group. It is evidently easily changed into phlobaphene, as indicated by the small quantities of soluble tannin found in the extracts obtained by Dragendorff's scheme.—Amer. Journ. Pharm., April, 1899, 164–170.

Gum Dammar—Collection, Commerce, etc.—Dr. Alfred Zucker communicates some interesting facts concerning the sources, collection and com-

merce of gum dammar. Genuine dammar is derived from several plants, namely *dammara alba*, *hopea splendida*, *hopea micrantha* and *engelhardia spicata*, all of them pine-like trees indigenous to the Moluccas. It exudes in tears from knotty excrescences on the roots or the lower parts of the trunks of these trees. The so-called kauri-copal (kauri-gum) is the product of the Australian kauri pine, trees of great height, the trunk frequently measuring 30 meters to the beginning of the branches, with a diameter of 4 to 5 meters. Here also the resinous exudation collects near the root-stock, forming large pieces, the value of which increases with the size, which in turn depends on the influence of the weather during the period of exudation. Large pieces of the dammar resin, however, become rarer from year to year, and the shipments are progressively becoming inferior as to size. Moreover, dammar is largely manipulated by unscrupulous dealers, in particular the Chinese, who so manipulate inferior qualities of the resin as to give it the appearance of the best. This has, in fact, reached such magnitude that the Chamber of Commerce of Batavia has been compelled to take the matter in hand, and the unsatisfactory conditions have, in some degree at least, been ameliorated by an agreement between the export firms and the dealers and collectors. Nevertheless, the Chinese have succeeded in establishing as permissible the presence of 28 per cent. of manipulated resin. The genuine dammar resin forms irregular colorless or pale yellow transparent pieces, having a conchoidal fracture, becoming sticky at the temperature of the hand, quite soft at 75°, thick liquid at 100° and thin liquid at 150°. While only partially soluble in alcohol or ether, it dissolves completely in fixed and volatile oils, in benzol, and in chloroform. Kauri-gum is at first milky turbid, but afterwards becomes yellow and amber-like in appearance. True dammar consists of 80 per cent. dammarylic acid, 19 per cent. resin and 1 per cent. gum.—Pharm. Ztg. Jan. 4, 1899, 6.

AQUIFOLIACEÆ.

Maté—Physiological Value.—Drs. John G. M. Kendrick and David Fraser Harris review the known facts concerning the source, chemistry and physiological uses of maté or Paraguay tea, and make some valuable observations concerning its use as a substitute for tea and coffee, as well as on its physiological value in general. So far as the chemistry of maté is concerned, their results corroborate most of the statements made by Prof. Herman Kuntz-Krause (see Proceedings, 1894, 868), according to which the drug contains traces of ethereal oils, odorous fatty matter, small amounts of glucosides and waxy substances, from 1 to 2 per cent. of caffeine, about 12.5 per cent. of tannic acid of essentially the same nature of that in tea and coffee, and a certain amount of cholin—the latter being important because it is known to be derived from lecithin, a substance that plays an important part in the chemistry of animal and vegetable cells.

Experience has shown that maté has several peculiarities that entitle it to a trial on a more extensive scale than it has hitherto enjoyed. It removes the feeling of fatigue in a remarkable degree, in the opinion of the author more so than either tea or coffee; its infusion is not so astringent as that of tea; it yields at least three successive infusions from the same leaves that have almost equal strength; and it forms an agreeable and invigorating beverage, which may be consumed either cold or hot with equal advantage. It possesses the advantage over tea, that it may be prepared by boiling without producing an unpalatable and indigestible beverage; and while its general physiological action appears to be the same as that of tea or coffee, it may be drunk with impunity a short time before going to bed, since, so far from keeping one awake, it tends rather to induce sleep. Furthermore, the author believes that the infusion of maté may be taken with impunity along with many articles of diet with which it is inadvisible to drink strong tea, and its use is unaccompanied by that degree of cerebral excitement which attends the use of the more familiar beverage. While the decoction is somewhat more astringent than the infusion of maté, this is hardly perceptible to the palate, and in neither case is the astringency of the same character as that of the tea, the tannin of mate being peculiar in that it will not tan hides or precipitate gelatin.—Pharm. Journ., July 16, 1898, 52–53.

EUPHORBIACEÆ.

Aleurites Moluccana—Characters of the Oil from the Seeds.—Prof. De Negri has obtained by extraction with petroleum benzin or with ether from the bankoul nut 62.25 per cent. of a light yellow fixed oil, which has strong drying properties and easily becomes rancid. The oil obtained with ether has the sp. gr. 0.926 at 15° C., and remains fluid at 18° C. (—18° [?], Rep.). Its saponification number is 187.36; iodine number, 139.34; iodine number of the fatty acids, 144.13; refractometer number, 76–75.5. The plant yielding the nuts is *aleurites moluccana*, indigenous to the East Indies, Ceylon, China, the Moluccas, Java, etc. The fleshy fruit contains two black seeds of about the size of a nut, having a hard, black shell, and a pleasant-tasting kernel. In its home the oil is extracted by expression and by boiling with water.—Apoth. Ztg., July 23, 1898, 515.

Cleistanthus Collinus—Proximate Examination of the Bark.—In view of the reputed poisonous effect of the bark of *cleistanthus collinus*, Benth., on fish, David Hooper has examined some of the bark received from W. F. Biscoe, who had called attention to the economic uses of the tree several years ago. The result was as follows: Moisture, 6.70 per cent.; fat, &c. (ether extract), 0.78 per cent.; spirit extract, 32.42 per cent.; water extract, 7.86 per cent.; pectin, &c., by difference, 2.45 per cent.; crude fibre, 42.44 per cent.; ash, 7.35 per cent. The fatty matter removed by ether possesses no particular reactions, and, as usual, was

associated with chlorophyll. The spirit extract was of a fine red color, and consisted almost entirely of tannin. Duplicate estimations of the amount of tannin in the original bark gave an average of 33.3 per cent., a quantity much above that found in ordinary tanning barks. Neither alkaloids nor glucosidal principles could be determined, and the author expresses the opinion that whatever activity the bark possesses is due to the tannin. He also believes that its effect upon fish is due to the tannin, and is supported in this view by some experiments which he made with ordinary tannin added to water containing fish. In this case toxic action was decidedly evident on the smaller fish, while all of them gave evidence of discomfort. The tree is known in the Nizam's dominions as the *Kodassi*, where its fruit as well as the leaves have the reputation of being toxic to man and animals.—Pharm. Journ., July 23, 1898, 74; from Indian Forester.

Iatropha Curcas—Properties of the Oil of the Seeds.—O. Klein communicates the results of an inquiry on the nature and physical constants of the fixed oil obtained from the seeds of *Iatropha curcas*, known as "purging nut oil." It is obtained by hot expression, and finds application as a lubricant, for illuminating purposes, and for making soaps. It is composed of the glycerides of palmitic, stearic, oleic and linoleic acids, with possible small quantities of the glyceride of myristic acid. The physical constants of oil obtained by cold and by hot expression, and by extraction with ethyl ether, as well as of the commercial oil, appear to agree well with each other in the following figures: Sp. gr., 919.9 to 924; refractive index at 25°, 1.4681 to 1.4687; iodine number, 107.9 to 110.4: saponification number, 197.0 to 203.6. The free acid varied from 0.68 to 4.96, while the volatile acid in the specimen prepared by cold expression amounted to 7.10 per cent., and in that prepared by hot expression to 5.5 per cent.—that in the other samples examined not being given. It is said that this oil is sometimes employed as an adulterant of olive oil; but the author is inclined to consider such an adulteration to be accidental rather than intentional, since its characteristic odor would prevent its use for this purpose.—Pharm. Ztg., Nov. 5, 1898, 793.

PIPERACEÆ.

Matico — Unsatisfactory Commercial Quality. — The observations of Schimmel & Co., made in the course of distillations of commercial matico (leaves and flowers) during recent years, lead them to the conviction that the drug as it now occurs in commerce is not uniformly obtained from the same plant. There do not appear to exist any decided differences either in the appearance or odor of the drug, but marked differences manifest themselves in the products obtained by distillation, and more particularly in the physical characters of these, which cannot be accounted for by possible variations in the relative proportions of leaves and flowers. Thus it

has been impossible in recent years to obtain any of the characteristic, easily crystallizable matico camphor at all, but instead of it, from one of the oils, they obtained a body which proved to be identical with asaron. The oil of recent production appears also to contain methyl eugenol, since by oxidation with permanganate small quantities of an acid melting at 174° was obtainable.—Pharm. Ztg., Nov. 5, 1898, 793.

RHAMNACEÆ.

Frangula Bark—Active Constituents.—In continuation of his previous experiments on the constituents of frangula bark (see Proceedings, 1898, 867), Dr. E. Amweg has succeeded in separating the active constituents into two glucosidal groups, the one readily soluble, the other sparingly soluble in water. These are obtained as follows: The powdered bark is percolated with alcohol of 60 per cent., the product is evaporated to the consistence of extract, the extract is treated with cold water, and the mixture filtered. The filtrate contains the easily soluble, or

Primary Glucosides, which are separated by adding absolute alcohol in excess, and drying the precipitate over sulphuric acid, thus forming a brown, amorphous, hygroscopic mass. The sparingly soluble, or

Secondary Glucosides, remain as residue of the extract upon the filter, in the form of a brown powder when dried. They are insoluble in cold water, somewhat soluble in hot water and absolute alcohol, but readily soluble in diluted alcohol and in acetone; while the "primary glucosides" are soluble in water and in alcohol up to 60 per cent. strength, but neither in absolute alcohol or acetone. Both glucosidal groups act in large doses as painless evacuants of the bowels. The "primary" glucosides are present in the bark to the extent of 20 per cent., the "secondary" to the average amount of 12 per cent.—this holding good for the commercial dry bark and for that in green condition. Both glucoside groups yield on hydrolysis: (1) small quantities of chrysophanic acid; (2) Schwab's emodin, amounting to about 6 per cent. of the weight of the bark; and (3) large quantities of a body which bears considerable resemblance to Liebermann's rhamnetin from the berries of *rhamnus amygdalina* (Gelbbeeren), for which the author preliminarily proposes the name

Frangula Rhamnetin.—This is readily soluble in alcohol and in acetone, and the crystals obtained from these solutions are sublimable in form of yellow needles, which are soluble with yellow color in solutions of sodium hydrate or carbonate, and in concentrated sulphuric acid. A fourth constituent found among the products of hydrolysis is provisionally called by the author

Iron-Emodin, on account of the iron which this body contains in fixed combination. It is readily soluble in alcohol and acetone, with difficulty in ether, but dissolves in alkalies with a cherry-red color. It is sublimable, forming yellow needles.

The "primary glucosides" are faintly bitter; the "secondary" have a harsh and unpleasantly bitter taste. In his previous paper the author had attributed the unpleasant secondary effects of the preparations of fresh frangula bark to the presence of a "ferment." By the influence of this ferment, as also by the presence of mould-fungi which may be introduced from the air, the "primary glucosides" are readily converted into "secondary glucosides." The absence of unpleasant secondary effects in old barks is attributable to the destruction of this ferment, but this may also be accomplished by heating the bark to 100° C. Finally, the author observes that in the preparation of the medicinal preparations from the bark the hydrolysis of the glucosidal constituents must be carefully avoided, and therefore neither acids nor alkalies are admissible in their preparation. For liquid preparations only the "primary glucosides" are to be considered, the best solvents being glycerin or 10 per cent. alcohol.—Pharm. Centralh., Oct. 27, 1898, 776.

Frangula Bark—Percentages of Glucosidal Constituents in Barks of Different Age.—Referring to Dr. Amweg's foregoing paper, Dr. K. Dieterich gives the results of some determinations of the "primary" and "secondary" glucosidal constituents in different barks, as follows, the percentage being based on anhydrous material:

	Primary Glucosides.	Secondary Glucosides.
Perfectly fresh bark	16.79 per cent.	17.18 per cent.
Commercial bark	16.59 per cent.	15.088 per cent.
Old bark	15.94 per cent.	15.23 per cent.
Perfectly fresh bark dried during 48 hours at 100°	16.16 per cent.	17.64 per cent.

These results give evidence that the presence of ferment has no influence upon the relative content of primary or secondary glucosides, as shown by the results obtained with the "perfectly fresh bark," before and after heating to 100°. They also show that, under the circumstances, the secondary glucosides may preponderate over the primary. The process of drying has no untoward effect upon the active constituents, and it is therefore recommended that frangula bark be heated during 48 hours at 100° C. before making preparations from it or dispensing it. In so far as the solvents suggested by Dr. Amweg are concerned, the author finds that fluid extracts prepared with them were not stable. They soon became turbid and fermentation set in.—Pharm. Centralh., May 4, 1899, 277.

TEREBINTHACEÆ.

Dacryodes Hexandra—Composition of the Oleo-Resin.—A. More has investigated the composition of the oleo-resin of *dacryodes hexandra*. He finds it to consist of volatile oil, a resin, and a white crystalline substance, having the composition $C_{25}H_{44}O$, melting at 166°–167°. The

essential oil contains pinene and sylvestrene, both lævorotatory. The crystalline substance is insoluble in water, and only sparingly soluble in strong alcohol. By the action of acetic anhydride it yields a crystalline monoacetate, m. p. 200°, and it therefore appears to be an alcohol. It is unaffected by potash and by all ordinary reagents. A tetranitro-derivative is produced by the action of fuming nitric acid. Chromic acid in acetic acid solution, while oxidizing it, appears to cause two molecules to combine; the product is a feeble acid, the molecular weight of which was determined by the cryoscopic method. The substance is probably identical with Personne's illicic alcohol. m. p. 175°, with which it agrees in composition, and which gives an acetyl derivative melting at 204–206°.—Chem. News, June 16, 1899, 284; from Proc. Chem. Soc., June 21, 1899.

Myrrh—Botanical Source.—From specimens of the bark, gum and leaves of the true myrrh tree, collected by Mr. and Mrs. Lort Phillips in Somaliland, and presented to the Museum of the Pharmaceutical Society of Great Britain, it is clearly proven that the plant figured by Bentley and Triemen in the "Medicinal Plants" is the true myrrh, and that the *commiphora myrrha* of Engler and the *C. schimperi* and *C. abyssinica* are not the plants recognized by the Somalis as the source of myrrh.—Pharm. Journ., April 1, 1899, 295.

Myrrh and Bdellium—Known Commercial Varieties.—With the main object of calling the attention of travelers in the regions whence commercial myrrh and bdellium are derived to the importance of determining the botanical source of these drugs and to encourage them in collecting specimens of the plants that are reported to yield them, Mr. E. M. Holmes has communicated a comprehensive paper with his usual thoroughness, in which he describes the different commercial varieties, and what is at the present day known concerning them. It seems absurd that the botanical source of a product which has been in commerce for the last 3,000 years should still remain unknown; but of late years an increasing number of travelers have visited Somali-land and Southern Africa, and it may therefore be hoped that, ere long, the problem may be solved. The drugs included under the names of myrrh and of bdellium are briefly described by Mr. Holmes, as follows:

1. *Somali Myrrh.*—This occurs in irregularly rounded pieces, one to three or more inches in diameter, brownish externally, often dull, with a brownish powder on the surface, having a translucent brownish fracture, often with white opaque streaks, and externally, sometimes, with exuded drops of oil, forming when dried concretions of minute tears of a reddish-brown color. The flavor is strongly aromatic, and the taste very bitter. The almost immediate and powerfully bitter taste is characteristic of true myrrh. The name, indeed "mor" or "mur"), is the Arabic, etc., for bitter. So far as is known, Somali myrrh is collected between Zeila and Cape Gardafui, on the slopes of the Ahl and Serrut, and probably

other mountain ranges near the coast line. It is brought to the great fair at Berbera in November, December, and January.

2. *Fadhli or Arabian Myrrh.*—This differs from the first in occurring in smaller, more gummy-looking pieces, presenting a more polished and less powdery surface, and in being more evidently made up of small tears. The pieces are rarely more than 1½ inches in diameter. The flavor is less strong than that of myrrh, but resembles it, and the taste is decidedly bitter. It never, however, presents white streaks on the fractured surface, nor oily excretions on the exterior. It is said to be collected on the hills about Shugræa and Sureea, east of Aden, by Somalis, who cross over for the purpose, and carry it to Aden.

3. *Yemen Myrrh.*—This myrrh is often in large pieces, like the Somali myrrh, 1 to 3 inches or more in diameter, and irregularly rounded. It is characterized by its dark reddish-brown color and a reddish-brown powdery surface. Internally the fracture is also reddish-brown, and has an oily appearance, but there is no trace of external exudation of drops of oil nor of whitish streaks in the fractured surface. The odor resembles that of myrrh, but is stronger and ranker. The taste is very bitter and the flavor is strongly but somewhat disagreeably aromatic. Yemen myrrh is exported from Makulla to Bombay and Aden.

4. *Perfumed Bdellium, or "Habaghadi" of the Somalis.*—This drug closely resembles Somali myrrh in shape, size and appearance. It has also white streaks in the fractured surface. The taste is less bitter and more acrid. The flavor is, however, entirely different, recalling that of some fungi, and once tasted, the flavor can never be mistaken for that of myrrh.

5. *African Bdellium.*—This occurs in hard, roundish pieces sometimes of pale and sometimes of a dark greyish-brown color (possibly derived from different species). The fracture is resinous without white streaks, and is dotted over with glistening points, more evident in the dark pieces. The fragments are translucent. Externally, the darker pieces are often partially covered with an opaque powdery coat. It has not the flavor or odor of myrrh, but a slight flavor recalling that of cedar pencils. The taste is not bitter, but slightly acrid.

6. *Opaque Bdellium.*—This is at once recognized by its dull opaque surface when broken. It is of a pale brown color, in roundish pieces, usually 1 to 1½ inches in diameter, and rather tough. The taste is very bitter and slightly acrid, and the flavor is slight, but cedar-like.

7. *Hotal.*—This resembles opaque bdellium, but is much more brittle. The taste is slightly soapy, but it has no aroma and is not perceptibly bitter.

8. *Translucent Gum Resin.*—This occurs in brownish-yellow pieces, like myrrh, but is more translucent and without white streaks. The taste is slightly bitter, but very acrid, and it has no definite flavor.

All the bdelliums here described, Nos. 4 to 8, are apparently collected in Somaliland, or perhaps also in the Shoa country, and as far south-west as Ogadayn.—Pharm. Jour., Nov. 26, 1898, 547.

Olibanum—Proximate Constituents—Halbey has made a very complete proximate examination of olibanum with results which may be summarized as follows: Substances soluble in alcohol, 72 per cent., apportioned as follows: Free boswellic acid, $C_{32}H_{52}O_4$, 33 per cent.; boswellic acid in ester combination, 1.5 per cent.; olibanosene $(C_{14}H_{22}O)_n$, 33 per cent.; volatile oil, composed of pinene, dipentene, phallandrene, cadinene, 4–7 per cent.; bitter principle, 0.5 per cent. Substances insoluble in alcohol, 28 per cent., apportioned as follows: Gum, combined with calcium and magnesia, 20 per cent.; vassonin, 6–8 per cent.; plant residue, 2–4 per cent. The *volatile oil* has previously been thoroughly investigated and described by Wallach, Rheindorff, Conrady, Schimmel & Co., and Walker. *Boswellic acid* is a resin acid, constituting a white or yellowish compact powder, beginning to melt at 142° C., and becoming completely liquid at 150° C., completely soluble in alkaline solutions, and doubtless crystallizable, though obtainable in crystals with great difficulty. *Olibanresin* remains undissolved when the alcoholic extract is treated with alkaline solution, and is apparently uncrystallizable. Arch. d. Pharm. (1898), 236, No. 7, 487–503.

Quebracho Colorado—Uses in the Arts.—Frederick L. Lewton calls attention to the different kinds of "quebracho" known in Central and South America, such as "quebracho blanco," "colorado," "moreno," "prieto," "negro," etc., the products of trees belonging to widely distinct genera. "Quebracho blanco" (*Aspidosperma quebraco-blanco*, Schlechtendal) furnishes the quebracho bark of pharmacy and medicine, but its use is insignificnnt when compared to that of "quebracho colorado," which is derived from

Schinopsis Lorentzii, (Griseb.), Engler, in Western Argentina and part of Chili, and from *S. balansæ*, Engler, in Paraguay and Eastern and Southern Argentina. The exceedingly hard wood—a characteristic of all quebrachos—is very rich in tannin, containing from 25 to 28 per cent., or about 10 per cent. more than is contained in the best sumach leaves. The entire trunks are ground up into a coarse sawdust, and then used in tanning. There are large works in Germany where an extract is prepared from this sawdust, which is supplied in two forms: a soft paste, containing 45 per cent. of tannin, and a solid extract, called "crystals," containing 60 to 65 per cent. of tannin, and resembling kino in appearance and some of its properties. The exceedingly durable wood is used for a variety of purposes, and makes very handsome furniture.—Amer. Journ. Pharm., Jan., 1899, 22–23.

Sicilian Sumach—Adulterants.—Fr. Andreasch gives a description of

the external characters, chemical properties and conditions necessary to determine the value of Sicilian sumach for tanning purposes, and for pharmaceutical use. Location, soil, conditions of the weather, the operations of collection, drying, grinding and storing, all have their influence upon its quality. In addition to this it is often grossly adulterated. Adulterants are less valuable kinds of sumach, sand, earths, the leaves of other plants, such as caroba, grape leaves, *citrus salvifolius*, *ficus carica*, *ailanthus glandulosa*, and particularly *pistacia lentiscus* and *tamarix africana*. Good Sicilian sumach contains on an average from 23 to 24 per cent. of tannin, and from 16 to 20 per cent. of other soluble constituents. *Ailanthus* contains 17 per cent., *tamarix* and *pistacia* about 10 per cent. of tannin, and larger quantities of other soluble constituents. Chem. Ztg., 1898, No. 83; Apoth. Ztg., March 8, 1899, 121.

B. Animal Drugs.

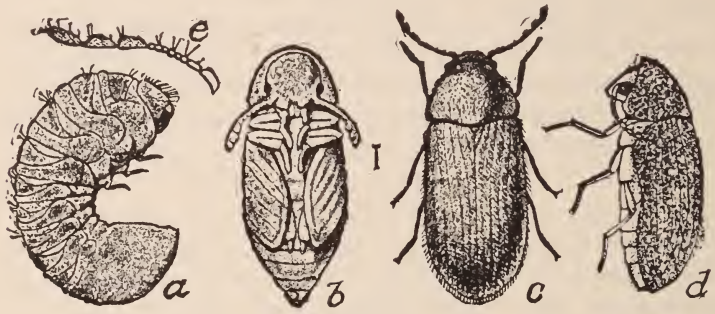
Sponges—Method of Bleaching Practiced in Tripoli.—In a recent consular report the following method of bleaching sponges as practiced in Tripoli is given: After being well soaked in the sea for cleansing purposes, the sponges are immersed in a tub of water containing oxalic acid, whence they emerge of a yellowish color, great care being required that they do not remain in the solution too long, otherwise they become "burnt," and consequently worthless. They are then dried, worked up in dry sand, shaken, and packed in boxes ready for shipment. The presence of sand is said to be necessary to suit the requirements of consumers in certain European countries where it is considered an infallible test of genuineness. —Pharm. Journ., Feb. 25, 1899, 199.

Ants—Alkaline Secretions.—C. Janet has made the interesting observation that test papers exposed in the chambers and galleries of ants' nests showed an alkaline reaction as long as the inmates are undisturbed, but when they are excited the alkaline reaction was replaced by marked acidity. It was furthermore found that this alkalinity was more intense in species that secrete the greatest amount of acid venom, and he concludes that its function is to serve as an antidote to the acid venom and to prevent auto-intoxication of the insects when large quantities of formic acid are discharged by them in defending their nests. The alkaline secretion is furnished by the tegumentary glands, especially those in the buccal region. —Pharm. Journ., Aug. 27, 1898, 241; from Compt. rend., cxxvii, 130.

Sitodrepa Panica—The Drug Store Beetle.—Prof. L. E. Sayre calls attention to the excellent description of the "drug store beetle," *sitodrepa panica*, given by F. A. Chittenden, Assistant Entomologist, U. S. Dept. of Agriculture. Receiving its specific name from having been originally found in dry bread, panis, it infects nearly everything commonly kept in drug stores, from insipid gluten wafers to such acid substances as wormwood, from the aromatic cardamon and anise to the deadly aconite and

belladonna, and it is particularly abundant in roots, such as orris and flag. This destructive insect is described by Mr. Chittenden as follows: It is cylindrical in form, measuring about one-tenth of an inch in length, and is of a uniform light-brown color, with very fine silky pubescence. The elytra are distinctly striated and the antennæ terminate in an elongated three-jointed club. In the accompanying illustration (Fig. 53) the beetle is shown at *c*

FIG. 53.

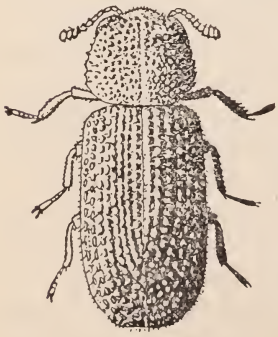


Sitodrepa Panica.

with the antennæ extended, the latter being shown at *e* very much enlarged. When at rest the head is retracted into the peculiar hood-like thorax, as shown in profile at *d*: and with the legs and antennæ folded under and tightly appressed to the body, the little creature easily escapes observation. The larva is white, with darker mouth parts, and of the cylindrical curved form shown at *a*. The pupa is shown at *b*. Prof. Sayre suggests as the most effective remedy treatment of the infected drug in air-tight vessels, with the vapor of carbon disulphide, and subsequent heating to drive off the latter.—West. Drug., July, 1898, 291.

Dinoderus Porcatus—An Insect Infesting White Pine Bark.—Prof. L. E. Sayre calls attention to a new drug insect which was found in large quantities upon a specimen of white pine bark sent to him by John S. Wright, of Indianapolis, Ind. This insect was determined by Prof. H. Kahl (confirmed by the coleopterist, A. E. Schwarz) to be *Dinoderus porcatus*, and is shown in the accompanying cut (Fig. 54). It belongs to the "death watch" family, *Ptinidæ*, which includes quite a number of beetles famous for their destructive habits. *Dinoderus porcatus* measures 3.5 Mm. in length, is of a brown color, and cylindrical in form. The thorax, or middle part of the body, is roughened by small tubercles, which are enlarged towards the front and sides so as to form

FIG. 54.



Dinoderus Porcatus

small tooth-like projections. The whole body is sparsely covered with erect yellow hairs. The ten-jointed antennæ have the last three joints enlarged, forming a club. It is distinguished from a closely allied species, *dinoderus substriatus*, by being opaque and by the intervals of the wing covers, elytra, being broken up into closely placed tubercles. For the destruction of this pest, as in the case of other insects infesting drugs, exposure to the vapor of carbon disulphide, under proper precautions, is the best. The bark should be placed in a suitable container upon a perforated diaphragm, beneath which a shallow dish containing a sponge saturated with carbon disulphide is placed. The container being tightly closed for several hours, the bark may be removed, and placed in a hot air oven to dissipate any enclosed vapor of carbon disulphide from its tissues.—Merck's Rep., April, 1899, 158.

Diaspis Amygdali, Tryon.—A New Fruit-pest from Japan.—A new fruit-pest, *diaspis amygdali*, Tryon, which bids fair to become troublesome, is described in "Gard. Chron." (xiv., 245) and shown in illustrations. It is a scale insect which was discovered on a recent consignment of Japanese cherries, and being quite hardy, is likely to flourish wherever it may gain a foothold. It is, moreover, very resistant to insectides, and most destructive to fruit trees.—Pharm. Journ., Dec. 3, 1898, 583.

Cantharis Vesicatoria—Experiments on Blistering Constituents.—Bertram Snyder, after giving a description of the common blistering beetles—*cantharis vesicatoria*, *C. vittata* and *mylabris cichorij*, accompanied by illustrations showing the three insects, records some experiments made with carbon disulphide and with chloroform as solvents. By treatment of the powdered cantharides with carbon disulphide by maceration, decanting the liquid, and subjecting it to spontaneous evaporation, a thick, dark brownish-green oily substance was obtained, which was solid below 180° C., and insoluble in alcohol, but soluble in ether, chloroform, and benzin. When dissolved in ether and partly evaporated a yellowish-brown fat separated, and when this was separated by filtration and the evaporation completed, a light pea-green oil was obtained, which possessed vesicant properties—though its action appeared to be slow. Cantharidin prepared by using chloroform as solvent, was much more active, raising a painful blister in four hours, whereas with the green oil, eight hours were required to raise a small blister. The author has experienced the effects of a volatile principle contained in the powdered cantharides, his eyes becoming irritated and inflamed from exposure to the vapor from a solution obtained in the course of his experiments. Relief was obtained by applying three drops of a solution of: Boric acid, 6 gr., camphor water, ℥ ij, and distilled water, ℥ j.—Amer. Journ. Pharm., Nov., 1898, 545–549.

Beeswax—Divergence of the Tunisian Product from Accepted Standards.—Bertainchaud and Marcille have examined a large number of specimens

of genuine Tunisian beeswax. They obtained analytical figures which show considerable divergence from the accepted standards for English and French beeswax, both in the free acid number and ester number, and the iodine absorption. In the thirty-three samples examined the lowest and highest figures obtained were as follows: Free acid, 17.4–20.6; ester, 69.7–70.5; iodine absorption, 6.7–17.12; melting point, 61° C.–64° C.; sp. gr. 0.9685–0.972.—Pharm. Journ., Sept. 24, 1898, 345; from Monit. Scient. (4) xii., 533.

Ambergris—Variety of Fungi Found in the Drug.—Beauregard gives an account of the different species of fungi found in ambergris. Among the most frequent is one belonging to the mucedineæ, a new polymorphic species, to which he gives the name *sterigmatocystis ambari*. Among the schizomycetes is also a new specie of *spirillum*, which he names *S. recti physeretis*, resembling *bacterium coli commune*, but not displaying the indol reaction, nor the power of causing lactic fermentation. It liquefies gelatin, but only at the spot of inoculation, and it is readily stained, but not by Gram's method.—Pharm. Journ., March 18, 1899, 251; from Ann. de Micrographie, 1898, 241.

Cod-Liver Oil—Its Source, Chemistry and Commerce.—At the quarterly meeting of the New York College of Pharmacy, Jan. 17, 1899, the subject of cod-liver oil was discussed in a number of papers, as follows: "Notes on the Cod-fish; its related species, food, habits, and propagation," by Major Fred. Mather, lately in charge of the Fish Hatcheries at Cold Spring, L. I. "The Commerce in Cod-Liver Oil," by I. H. Stallman, of Stallman & Fulton. "The Chemistry of Cod-Liver Oil," by E. H. Gane, with McKesson & Robbins. "The Pharmacy of Cod-Liver Oil," by Caswell A. Mayo. With the exception of the last, these papers are published in full in Merck's Report, March, 1899, 108–112.

Cod-Liver Oil—Pharmacopœial Tests of Quality.—Dr. K. Baumann observes that the pharmacopœial (Germ.) methods of determining the quality of cod-liver oil are not sufficient to establish its identity and purity. Cod-liver oil may be adulterated with vegetable oils, particularly the drying oils, and yet respond to these tests. Mineral oils also may be present, and are detected with ease by reason of their non-saponifiability—but such a test is not required by the German Pharmacopœia. In a recent sample, as much as 30 per cent. of mineral oil was found, and yet this sample would readily pass muster under the prescribed pharmacopœial tests. The author considers Salkowsky's test for the presence of vegetable oils, which depends upon the determination of the melting point of cholestrin, to be the most available. This test has been proposed by Bömer as a general one for the detection of vegetable in animal oils. The pharmacopœial test of free acid with litmus paper is also unsatisfactory, and might be improved by a method of titration of the alcohol-ethereal solution of

sample with potassium hydrate, and by establishing a limit of acidity.—Apoth. Ztg., Dec. 14, 1898, 869.

Cod-Liver Oil—Estimation of Iodine.—The following method for determining the amount of iodine in cod-liver oil is recommended by E. Reboul: Into a 150 Cc. flask introduce 25 Gm. of the oil, 25 Gm. of alcoholic potassium hydroxide, and 10 Gm. of potassium nitrate. Attach a reflux condenser to the flask and heat for an hour on a water-bath. Evaporate the solution of saponified oil to dryness in a porcelain capsule, and then calcine the residue over a Bunsen burner, adding potassium nitrate from time to time until a white residue is obtained. Dissolve the ash in dilute hydrochloric acid, transfer to a 250 Cc. flask with about 10 Cc. of solution of ferric chloride and enough water to two-thirds fill the vessel. Connect the flask with another containing 50 Cc. of a 5 per cent. solution of potassium iodide, heat to ebullition, and continue the heat a few minutes so that the iodine liberated by the ferric chloride may be absorbed completely by the potassium iodide solution. The free iodine in the latter is then estimated in the usual way by means of sodium thiosulphate.—Pharm. Journ., Sept. 17, 1898, 325; from Bull. Soc. de Pharm. de Sud-Ouest. III., 292.

Egg-Yolk—Pharmaceutical Uses and Composition.—L. Bernegau speaks highly of egg-yolk as medium for preparing emulsions (which see), salves, soaps, and the like. He has had analyses made by Dr. Katz, who finds the air-dry substance to have the following composition: Water, 7.41; fat, 50.62; nitrogen, 5.39; proteine substances, 33.31; non-nitrogenous substances—not fat, 8.66; phosphorus, 0.991; iron, 0.0264; chloride of sodium, 0.74. In his admirable paper the author draws attention to the various dietetic uses to which egg-yellow may be put. Being largely a by-product in the preparation of albumin, it may be obtained cheaply, and preserved by drying.—Apoth. Ztg., Oct. 12, 1898, 721–722.

Animal Materia Medica—Review of the Principal Remedies.—In view of the official recognition given to the use of animal substances in medicine by the introduction of certain preparations of the thyroid gland into the British Pharmacopœia, J. C. McWalter reviews some of the principal remedies of animal origin which have in recent years been tried for the relief of disease. The lengthy paper illuminates the therapeutic rather than the pharmaceutical features of the so-called animal extracts, and it suffices therefore to merely enumerate the substances and preparations under discussion, with such remarks concerning their origin and uses as can be given in brevity and with advantage to the pharmacist.

Succus Testibus Paratus.—A sterilized extract, suggested by Brown Sequard as of possible value in insanity, senile debility, and various diseases where stimulation of the nervous system is indicated.

Sperminum.—A chemical preparation secreted by most glands, and

present in the blood in the normal condition. Proposed by Pœhl in form of sterilized solution prepared from fresh animal glands, to be injected in cases in which the normal spermine is absent or deficient.

Cerebrum Exsiccatum Pulv.—A dried preparation from fresh brains of calves employed for mental troubles and for neurasthenia. A liquid preparation has also been employed subcutaneously under the name of "liquor cerebri sterilisatus," but the author expresses the opinion that the most available and serviceable form will be an emulsion, prepared on the lines of Mr Martindale's pancreatic emulsion, as follows: Fresh lard, melted, 15 ozs.; distilled water, 15 ozs.: grey substance of brain of recently-killed calf or sheep, 15 ozs.; powdered gum tragacanth, 300 grains; oil of bitter almonds, 15 minims. The brain, freed from membrane and white substance, and hot from the animal, should be dipped into the melted lard, and the mixture strained through a coarse horse-hair sieve. It is then emulsionized with the tragacanth and water in a sterilized mortar, the oil of bitter almonds being added last, and dispensed in wide-necked bottles.

Glandulæ Suprarenales Siccatæ Pulv.—prepared from the little gland, shaped like a cocked hat and perched on the top of the kidneys of most animals. Regarded as being efficient in the treatment of Addison's disease, which is characterized by bronzing of the skin.

Hypophysis Cerebri Siccat. Pulv.—prepared from that portion of the brain which rests on the bony structure known as "sella turcica," and which is called the pituitary body. Recommended in the disease known as acromegaly, in which the extremities are enormously increased in size, and headache with neuralgic pains are distressing symptoms.

Medulla Ossium Rubrum, is reputed to be positively useful for the relief of anaemic conditions. Most of the reports have been made on a dry preparation of the red marrow of bones, but a far more active preparation is obtained by macerating the fresh bones in glycerin, such a preparation being possessed of undoubted therapeutic power.

Ovaria Siccata.—prepared by removing the fat as far as possible from the entire orary of the cow, and drying the substance under antiseptic precautions at a temperature not exceeding 40° C. Has been found remarkably effective in repressing, for a shorter or longer period, or in some cases even permanently, all the symptoms of sympathetic neurosis, such as palpitation of the heart, failure of memory, nightmare, insomnia, ordox fugax, and climacteric troubles in general.

Renes Siccata—prepared from the fresh kidney of the pig or sheep, of which it represents six times its weight, has been found useful in cases of kidney disease, which are amongst the most intractable in medical practice. The fresh gland or the glycerin extract would however seem to be more effective, judging from the results obtained in a large number of nephritic cases.

Thymus Siccatus.—Obtained by subjecting the thymus gland of calves or sheep to peptic digestion, and evaporating the solution to dryness. The gland is assumed to secrete a fluid which modifies the blood to a marked extent, and which is to some extent antagonistic in its effects to the secretion of the thyroid gland. It has been prescribed with success in defective nutrition in children, and has also been beneficial in chlorosis, anæmia, etc.

Prostata Siccata Pulvis—the dried prostate gland of neat cattle, has been recommended and, in some cases, successfully used in the hypertrophied condition of that organ in old people. In the case of this gland, as in the case of others, it is quite probable that the fresh gland, or a suitably prepared extraction from it, would prove more effective. An efficient extraction obtained by macerating two parts of the fresh gland for forty-eight hours in two parts of sterilized glycerin and 1 part of 50 per cent. solution of salt,

Thyroidinum Siccatum, is now an official preparation of the British Pharmacopœia and the best known of the animal remedies.

Hepar.—The liver secretes a substance which, when introduced into the veins, neutralizes the toxic effects of the bile present in the blood, and prevents the formation of tox-albumins. The fresh hepatic liquor or juice appears useful in all intoxications by the bile salts or by the coloring matter of the bile. The liver exercising an important function in the formation of sugar, an extract has also been tried in cases of diabetes. It has also been used with marked benefit in cirrhosis of the liver, being administered both hypodermically and by the mouth. The dose is 3 or 4 ounces of the fresh liver per day or $\frac{1}{5}$ that quantity of the dried gland.

Lien Preparatus.—An aqueous extract of the spleen has been employed in the treatment of anæmia and chlorosis, and has succeeded in improving the appetite, re-adjusting menstrual irregularities, and increasing the weight of the body. It appears to contain an active specific substance, which is not destroyed by boiling. Dried spleen, prepared by aseptically drying the spleen of sheep or pigs, represents five times its weight of the fresh organ, and is given in doses of 4 to 12 grains.

Mammæ.—The mammary gland of the cow has been used with remarkable results in cases of uterine fibromata, menorrhagia, and metrorrhagia. One part of the dried fresh gland is equal to 8 or 9 parts of the fresh, and is given in doses of 5 to 10 grains.

Pulmones.—A preparation of the parenchymatous lung tissue of robust young sheep is said to have a tonic effect in small doses and toxic properties in large ones. It has been found useful in cases of chronic bronchitis, and in diseases of the lungs and larynx. The pulmonary juice has been given both hypodermically and by the mouth, while the dried substance is also used in dose of a drachm daily.

Glandulæ Bronchiales.—While the bronchial glands are credited by physiologists with secreting a substance capable of resisting the entry of bacilli into the air passages, therapeutic experiments made have so far been disappointing. It is thought, however, that with the elimination of certain toxic albumins from its preparation, the bronchial gland may prove of great value.

Extractum Corporis Ciliaris.—The little purplish-black substance in the eye-ball, called the ciliary body, the function of which is to filter the serum and to secrete into the eye a fluid—the aqueous humour—is recommended in certain diseased conditions of the eye in which the aqueous humour fails to be filtered properly. An extract of the ciliary body of the ox's eye, to which a little resorcin is added as a preservative, is said to modify the trouble considerably, one drop being injected or dropped into the eye every two hours. Finally

Glandula Parotis, the gland which, when inflamed, gives rise to the mumps, has been found useful in diseases of the ovaries. The dried gland, which may be made from the organs of rams or ewes, is equivalent to ten parts of the fresh substance, and is given in 5-grain doses.—Proc. Brit. Pharm. Conf., 1899, 385–399.

INORGANIC CHEMISTRY.

NEW ELEMENTS.

Polonium—A Supposed New Element in Pitchblende.—P. Curie and Mme. S. Curie, in the course of their studies of certain minerals containing uranium and thorium—pitchblende, chalcolite, uranite—have observed that the emission of the new rays described by Becquerel and attributed to uranium and thorium was greater in these minerals, and particularly in pitchblende, than could be accounted for by the presence of these elements. The pitchblende under examination was about twice and a half more active than the uranium used for comparison, and they have succeeded in separating from it a body, as yet not entirely pure, which possesses a radio-activity 400 times greater than that of uranium. They are therefore led to believe that the substance isolated by them contains a new element, for which, if its existence be confirmed, they propose the name *polonium*. The authors' add, however, that Demarcay has examined the spectrum of the body found by them, but has not been able to distinguish any characteristic lines except those due to impurities.—Chem. News, July 29, 1898, 49: from Compt. rend., cxxvii., No. 3.

At the request of Mr. and Mrs. Curie, Eug. Demarcay has made a spectroscopic examination of the substance consisting chiefly of barium

chloride, but supposed by them to contain a new radio-active element. He found on measuring the lines: (1) Barium, with great intensity of both the strong and weak lines; (2) lead; (3) platinum, due to the electrodes; (4) traces of calcium, probably from the solvent; and (5) a line, stronger than the weak lines of barium, with wave length 3814.8 (Rowland's scale). This line does not appear to have been attributed to any known element, and confirms the existence of a small quantity of a new element in the substance submitted to Mr. Demarcay for examination.—Chem. News, Jan. 13, 1899, 13; from Compt. rend., cxxvii, No. 26.

Confirming the observations respecting the presence of polonium by researches since made, the same authors, in conjunction with G. Brémont, announce the discovery of a second new metal, which is strongly radio-active, and differs entirely from polonium. A line (A = 3814.8) has been found in the spectrum of this supposed new body, which does not appear to be due to any known element. The intensity of this line increases with the radio-activity, and the name

Radium is therefore suggested for the supposed new element. In its chemical properties it resembles barium.—Pharm. Jour. Jan. 1, 1899, 52; from Compt. rend., cxxvii., 1215.

Neon—Properties. — Professor Ramsey and Morris W. Travers have continued their investigation of the "companions of argon," one of which they have named "neon" (see Proceedings, 1898, 893), and describe the method by which they have obtained neon in considerable quantities, though not in a condition free from argon. They found the density to be 14.67; but in order to bring it to its position in the periodic table, a density of 10 to 11 is required, and assuming the density of argon to be 20, and that of pure neon 10, the product obtained contains 53.3 per cent. of the new gas. A second "companion of argon" has also been observed by the authors. It was obtained by the volatilization of a white solid which remained after the liquid argon, produced in the course of their experiment, had been boiled away. Possessing many characteristics in common with argon, the new gas has been named

Metargon.—It is a monatomic substance, and its density does not differ sensibly from that of argon. Nevertheless, it differs very markedly from argon in its spectrum, and in its behavior at low temperatures, and must therefore be regarded a distinct elementary substance. It would appear to hold the position towards argon that nickel does to cobalt, having approximately the same atomic weight, yet different properties.—Chem. News, July 1, 1898, 1–2.

Argon—Companion Elements.—Wm. Ramsey and Morris W. Travers describe besides neon, krypton and metargon, a fourth companion gaseous element of argon, for which they propose the name

Xenon, and which has not hitherto been described. It is a heavier

gas than the others, and very easily separated, for it possesses a much higher boiling point, and remains behind when the others have evaporated. This gas, which has been obtained practically free from krypton, argon and metargon, possesses a spectrum analogous in character to that of argon, but differing entirely in the position of the lines. It appears to exist only in minute quantities, however. Indeed, all of these gases are present only in small amount in the argon, and in correspondingly minute amounts in the air. Thus, neon is present in argon only to the amount of about 50 Cc. in 18 liters, the proportion of air being consequently about 1 : 40,000.—Chem. News, Sept. 23, 1898, 155.

In a subsequent paper the same authors give a circumstantial description of the process by which they have succeeded in removing the companion gases of argon (*neon* (or "new"), *krypten* (or "hidden"), *metargon* and *xenon* (or "the stranger"), and having thus been put in possession of

Pure Argon, they were unable to determine its density. Their results conclusively prove that this density does not differ greatly from that obtained by Lord Rayleigh, viz., 19.94, nor by one of them, viz., 19.941, and that the true density may be taken as 19.957.—Chem. News, Jan. 27, and Feb. 3, 1899, pp. 37–39 and 49–50.

Etherion—A New Gas.—Charles F. Brush announces the discovery of a new gas in the atmosphere, which he has named "etherion." It appears to have no chemical effect on familiar elements, and will thus not burn or form combinations, and would probably always have remained unknown if its discovery depended on the usual chemical experiments. It is presumably an elementary constituent of the atmosphere, and possessed of some extraordinary properties, its chief characteristics thus far ascertained being its enormous heat conductivity at two pressures, which is demonstrated by the author by a comparison with that of some of the well-known gases.—Chem. News, Oct. 21, 1898, 197–198.

Etherion—Probably Simply Water Vapor.—In the absence of the complete paper of Mr. Brush, Sir William Crookes hesitates to speak at all positively concerning the identity of the supposed new elementary body "etherion"; but on the evidence at present available, he considers it more probable that etherion is water vapor than that it is a new elementary gas. This is, moreover, corroborated by the observations made by Mr. Brush himself, that etherion is absorbed by phosphoric acid and soda lime, as well as by the powdered glass from which it has previously been driven off by heat.—Ibid., Nov. 4, 1898, 221–222.

OXYGEN.

Liquid Ozone—Boiling Point.—L. Troost describes the experiments made to determine the boiling point of liquid ozone, which he concludes to be —119° at the atmospheric pressure. The ozone was obtained by

using a Berthelot ozonizer kept at about —79° by a mixture of solid carbonic anhydride and methylchloride. The liquefaction is produced in a vertical tube, the lower part of which is immersed in a bath of liquid oxygen, contained in a cylindrical glass vessel with double sides, with the intermediary space exhausted to a Crookes vacuum, as recommended by Prof. Dewar. The liquid oxygen used in these experiments was obtained by means of an apparatus constructed according to the method given by Prof. Dewar—using commercial compressed oxygen cooled down to —79° in a long serpentine tube. In this manner about a quarter of a liter of liquid oxygen can be obtained in the laboratory or lecture room in less than half an hour, without the use of pumps or any motive power.—Chem. News, July 15, 1898, 29; from Compt. rend, cxxvi, No. 25.

Oxygen—Use in Compressed Form in Elementary Organic Analysis.—F. G. Benedict and O. F. Tower have used compressed oxygen with advantage in making carbon and hydrogen determinations. As supplied in steel cylinders, it is comparatively dry and free from carbon dioxide, so that its purification is comparatively easy as follows: The carbon dioxide is absorbed by passing the oxygen through a small U-tube, and the greater part of the moisture by causing the gas to bubble through a cylinder, about 12 Cm. high, about half-filled with concentrated sulphuric acid. This also shows the rate of flow, which must be regulated as the gas enters the combustion tube, which it does after it has been completely dried by traversing a second small U-tube containing pumice stone saturated with sulphuric acid. A rubber tube leading from the supply cylinder connects with a T-tube, one end of which dips one inch into mercury contained in a small bottle fitted with a stopper having two holes, one of which is left open. The other end of the T-tube is connected by means of rubber tubing with the purifying arrangement described, and this in turn with the combustion tube by rubber tubing provided with a pinch-cock. The flow is regulated by proper adjustment in opening and closing the valve in the cylinder, the open hole in the mercury bottle carrying off any excess until the proper adjustment is made.—Journ. Amer. Chem. Soc., *21*, 390.

HYDROGEN.

Liquid Hydrogen—Boiling Point.—Prof. Dewar, at a meeting of the Royal Institution, May 1, 1899, announced that having obtained liquid hydrogen in considerable quantity, he had directly determined its temperature and other physical constants, finding its boiling point to be much lower than was previously supposed,—namely, 20 degrees above the zero of absolute temperature, and attaining by exhaustion a temperature of only 15 degrees absolute. Pending the discovery in quantity of some yet lighter gas, there is no means in sight of bridging this gap and reaching the zero point.—Chem. News, May 5, 1899, 205.

Hydrogen—Evidence of Metallic Attributes.—The recent researches of

Colsen have brought to light further evidence of the metallic attributes of hydrogen. He finds that this element will replace metals in many combinations; in some cases even at ordinary temperature, in others, not until a somewhat high temperature is reached. Yellow britannic silver phosphate, when exposed to an atmosphere of hydrogen, gradually darkened in color, and in three months was found to have absorbed a considerable amount of the gas. The silver salt had become acid in reaction, and on analysis, the amount of black reduced silver found was directly proportioned to the amount of hydrogen absorbed. On increasing the temperature, the displacement of the metal by the hydrogen took place much more rapidly, but the liberated silver was white. Neither silver sulphate nor copper sulphate were acted upon by hydrogen at the normal temperature, but on heating, a considerable amount of the copper was quickly displaced by the hydrogen.—Pharm. Journ., Jan. 7, 1899, 1; from Compt. rend., cxxvii, 874.

Hydrogen—A Constant Constituent in the Free State in Air.—A. Gautier finds that free hydrogen, although present only in minute quantities, is a constant constituent of the atmosphere. The average amount present is about 0.015 per cent., by volume, or nearly one-half that of the normal amount of carbonic anhydride present in pure air.—Pharm. Journ., Nov. 26, 1898, 545; from Compt. rend., cxxvii., 694.

Hydrogen—Color of Flame.—Schlagdenhauffen and Paget observe that authors generally agree in saying that the hydrogen flame is very pale; but it has been little noticed that the flame is green or blue, according to the purity of the gas. The authors have experimented on this subject, and have arrived at the following conclusions: (1) The flame of hydrogen, whether pure or impure, becomes decidedly violet-blue when it is pressed down by a cold body, glass or porcelain, with various experimental conditions. (2) This coloration is due, not to the presence of hydrogen sulphide, as Salet believed, but to that of hydrogen selenide.—Chem. News, June 9, 1899, 276; from Compt. rend, cxxviii., No. 19, May 8, 1899.

Water—A New Reagent.—Brooks recommends the double iodide of lead and potassium, $PbI_2.2KI$, as being a very delicate reagent for water. This colorless crystalline compound is rapidly decomposed with separation of yellow lead iodide even when simply exposed to moist air. Hence the necessity of preserving the double salt over quick-lime. It is prepared by dissolving 1 Gm. lead nitrate in 10 Cc. of water and adding saturated solution of potassium iodide as long as the precipitate at first formed is redissolved. After a short time colorless crystals of the double iodide are copiously deposited. These are washed with absolute alcohol and carefully preserved over quick-lime.—Pharm. Ztg., Oct. 8, 1898, 720; from Pharm. Weekbl., *35*, No. 20.

Water—Estimation of Nitrates and Ammonia.—The quantities of

chemicals which have to be determined in water analyses are, as a rule, so minute, that the tendency in recent years has been to search for and make use of delicate colorimetric tests, particularly in the case of the nitrogen containing compounds. The method generally used depends upon the formation of aromatic nitro-derivatives, which have intense coloring power, especially in alkaline solutions. Calling attention to this method, Frank X. Moerk observes that the only objection to it is the difficulty experienced at times in matching the color. As carried out by him for some years it is as follows: 10 Cc. of the sample are evaporated to dryness in a small porcelain capsule on a water-bath; the residue is thoroughly mixed with 1 Cc. phenol-sulphuric acid (37 sulphuric acid, 6 pure phenol, 3 distilled water) and heated on the water bath for five minutes; the liquid is diluted with 5 Cc. water, an excess of water of ammonia added, drop by drop (about 5 Cc.), and the alkaline solution is finally suitably diluted for comparison with a standard solution. For a long time the author was unable to devise a modification which would satisfactorily enable the color comparison under all conditions. He has now, however, been successful in every case tried, by a process which depends upon the volatilization of the nitric acid when the water residue, in a duplicate test, is heated for some minutes with sulphuric acid on a water-bath, while the organic matter is acted upon by the sulphuric acid to produce the substances causing the off-color; in the test proper the nitric acid reacts to form a nitro-derivative, while the organic matter is acted upon as a duplicate test; two solutions are therefore obtained, one representing only the color due to the organic matter, whilst the other contains additionally the color due to the nitro-derivative; by suitably diluting these solutions and adding to the former sufficient of the standard nitro solution until the two solutions are matched, the quantity of nitrates can be determined. The importance attached particularly to the presence of

Albuminoid Ammonia, and the difficulty of getting the reagents perfectly free of ammonia, makes this the most difficult determination in water analysis. The author has carried out these determinations for some years past in a manner which insures the greatest possible accuracy with the least amount of extra manipulation. Preliminarily it is necessary to free the *alkaline potassium permanganate* solution, which is made by simply dissolving the chemicals in distilled water, from ammonia, for it cannot be kept free from it for any length of time. This is done by charging the retort with 30 Cc. of the alkaline permanganate solution, adding 200 Cc. of river or distilled water, adding some copper turnings to prevent bumping, and distilling off portions of 10 Cc. each, until Nessler's reagent no longer indicates ammonia in the distillate—six fractions of 10 Cc. being usually sufficient. The distillation is continued until about 60 Cc. are left in the retort; 100 Cc. of the water to be tested are then added, and 100 Cc. of distillate are collected in fractions of 10 Cc. and

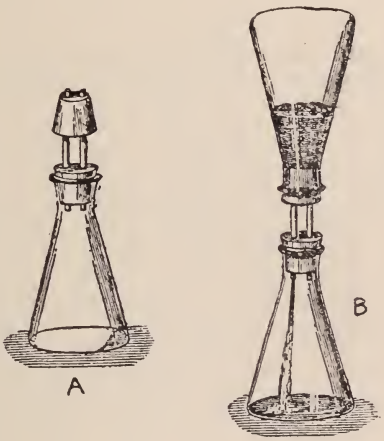
set aside in regular order. In these fractions the *total ammonia* is determined. The *free ammonia* is then determined by subjecting 100 Cc. of the sample to the distillation in the presence of a little sodium carbonate, collecting four or five fractions of 10 Cc. each, and nesslerizing them by well-known methods. On deducting the free ammonia so ascertained from the total, the amount of *albuminoid ammonia* is accurately determined. For the details reference must be had to the original papers in Amer. Jour. Pharm., April, 1899, 157–161.

Potable Water—Determination of Nitrites.—Lucien Robin, chemist in the Paris Municipal Laboratory, employs a process for the detection of nitrites in water, which is based on the fact that when pure potassium iodide is added to a solution of the nitrite in the presence of acetic acid for a time, a definite quantity of free iodine is always liberated by a definite quantity of nitrous acid. To a mixture of 50 Cc. of the sample and 2 Cc. of a 20 per cent. solution of chemically pure potassium iodide, 2 Cc. of glacial acetic acid are added, the mixture is shaken, and set aside for *exactly* half an hour. The free iodine is then determined by titration with a standardized solution of sodium thiosulphate, prepared by diluting 50 Cc. of decinormal solution to a liter; starch solution being used as indicator. In this way 0.1 Mgm. of nitrous acid per liter may be detected. If the sample under examination is not perfectly clear, it must be filtered; if it is colored, aluminum sulphate and sodium carbonate are added in succession, or else 100 Cc. of the sample is mixed with 2 Cc. of glacial acetic acid, placed in a distilling flask, and 50 Cc. of the distillate collected. In the presence of hydrogen sulphide, it is necessary to treat 125 Cc. of the sample with a little silver sulphate, filter, and 100 Cc. of the filtrate is then distilled.—Pharm. Journ., July 30, 1898, 97; from Journ. de Pharm. et Chim., 1898, 575.

Water—Simple Method of Determining Nitric Acid.—E. Bohlig has devised a simple method for the estimation of nitric acid in water, which is based on the double decomposition of HNO_3 and HCl into chlorine, etc., and the determination of the chlorine by titration with K_4FeCy_6. In testing water, for example, 100 Cc. are evaporated to dryness in an Erlenmeyer flask placed on a hot plate. After cooling, a few Cc. of pure concentrated H_2SO_4 are poured down the inside of the flask, and to prevent loss of Cl, a rubber stopper, fitted witb two glass tubes and a second stopper as shown, is at once inserted. The flask (Fig. 55, *A*), is moved about till all evolution of gas has ceased, and a uniform solution is obtained. The flask is now held obliquely, and the upper stopper is tightly pressed into a second flask (Fig. 55, *B*), holding 80–100 Cc. of pure water, after which it is inverted, as shown, so that the water pours into the sulphuric acid solution. By pouring the liquid backwards and forwards and shaking thoroughly, the gases are completely absorbed, and the solution will now give the iodide of starch reaction strongly if any HNO_3 was present

in the water. When a quantitative determination is to be made, the second flask should contain instead of pure water a measured quantity of standard solution of $K_4FeCy_6.3H_2O$, the excess of unoxidized ferrocyanide being determined after the reaction by titration with permanganate. The calculations are obvious: $3Cl = HNO_3$. Organic matter need not interfere with the titration with $KMnO_4$, as the color of the latter disappears

FIG. 55.



instantaneously when K_4FeCy_6 is present, whereas organic matter decolorizes it comparatively slowly. Test analyses are stated to have been satisfactory. If the liquid to be tested does not contain sufficient HCl for the first reaction to occur completely, enough alkali chloride must be added. —Merck's Rep., Jan., 1899, 26; from Jour. Soc. Chem. Ind., xvii., 953.

Water—Practical Sterilization by Means of Ozone.—An apparatus for the production of ozone, to be applied in a method suggested as the result of the studies of Marmier and Abraham, has been successfully employed at Lille, France, in rendering drinking water bacteriologically pure on an industrial scale. A. Calmette, one of the experts appointed on the Water Commission by the municipal authorities, reports that the efficacy of the ozonizing apparatus is unquestionable, and the method is superior to all others that have been tried, as well as suitable for dealing with large quantities of water. The apparatus is sufficiently strong, and its output is regular enough to justify its use in industrial operations. All the pathogenic or saprophytic microbes met with in the waters under experiment were destroyed by passing the water through the apparatus. A few of the *bacillus subtilis* alone survived the ordeal, but it is important to note that this particular *bacillus* is harmless to man and to animals. In short, the water after treatment is weaker in organic matter than ordinary drinking water, is less prone to ulterior pollution, and is more agreeable to the

palate by reason of the process of aeration which it undergoes.—Pharm. Journ., May 27, 1899, 483; from Annales de 'l Inst. Pasteur, 13, 344.

Drinking Water—Disinfection with Sodium Peroxide.—Franz Blatz records experiments made which have determined sodium peroxide to be a convenient and efficient disinfecting agent for drinking water, the peroxide in contact with water being decomposed into sodium hydrate and hydrogen dioxide, 78 parts of Na_2O_2 yielding 34 parts of H_2O_2. In practice, he finds it advisable to add to the water an equivalent quantity of citric acid before adding the peroxide, since the sodium hydrate formed precipitates any carbonates that may be present in the water, and also communicates an alkaline taste. The relation of the two substances being 234 parts Na_2O_2 to 420 parts of citric acid, 2 parts of the latter may be used for 1 part of the peroxide required. The author finds that water containing large quantities of bacteria, when treated with Na_2O_2 in the proportion of 1 : 1000, becomes completely freed from them in the course of 24 hours. In the case of the cholera bacillus, 3 hours are sufficient, while the typhus bacillus required 6 hours for its complete destruction; but, inasmuch as the development of these bacilli is interrupted in a very short time after the addition of the disinfectant, it is quite possible that water may prove innocuous within 15 minutes after such additions have been made. The author calls attention in this connection to the fact that Na_2O_2 must be carefully preserved from contact with easily oxidized substances, such as cotton, alcohol, etc., which may be readily ignited by such contact. Properly preserved in glass or tins, well closed, it may be kept unchanged for a long time—a further advantage over hydrogen dioxide solutions commonly employed.—Apoth. Ztg., Oct. 15, 1898, 728.

Distilled Water—Pharmaceutical Uses.—Otto de Kieffer calls attention to the desirability and necessity of using distilled water in all pharmaceutical operations where water is required, whether in the compounding of prescriptions or for making preparations. He emphasizes that much of the water ordinarily supplied is unfit for prescription work on account of the mineral matter held in solution. The use of pure water for making preparations not only enhances the appearance in some cases, but plays an important role in their keeping qualities.—Alumni Report, June, 1899, 113.

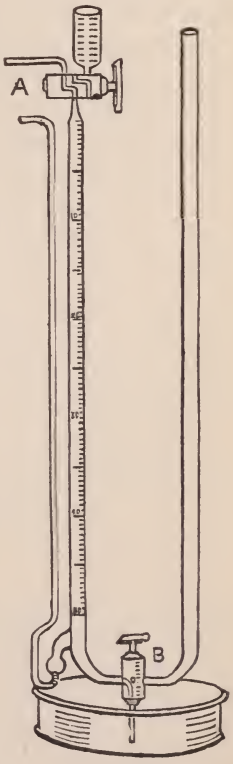
Hydrogen Peroxide—Delicate Reaction with Ferrous Ferrocyanide.—Edgar S. Barralet recommends the well-known action of hydrogen peroxide to quickly oxidize and convert the pale blue precipitate, obtained by adding a solution of potassium ferrocyanide to a solution of a ferrous salt, to the deep blue "Prussian blue," as a delicate test for its presence. The test is exemplified as follows: Ten Cc. of hydrogen peroxide, 10 vols. = (3 to 3.2 per cent.), were diluted to 100 Cc. with water; 10 Cc. of this diluted solution were now made again to 100 Cc. 20 Cc. of this solution diluted with water to 1 liter gives a solution of hydrogen peroxide contain-

ing 0.2 Cc. of hydrogen peroxide of 3 per cent. strength, or approximately 1 part of H_2O_2 to 165,000 parts of water. Such a solution instantly intensifies the pale blue color of ferrous ferrocyanide, 1 Cc. in 20 Cc. of the freshly-precipitated compound being quite sufficient to make the reaction apparent. A similar addition of 1 Cc. of unboiled water has no effect. The ferrous ferrocyanide should either be freshly precipitated for each test or be kept in a bottle under a layer of petroleum.—Chem. News, March 24, 1899, 136.

NITROGEN.

Nitrometer—Modified form for Use in Absolute Nitrogen Estimations.—H. A. D. Jowett and F. H. Carr have designed the form of nitrometer shown by Fig. 56, which they have used with advantage in the course of the investigation of the aconite alkaloids in which it was necessary to make a large number of determinations of nitrogen by the absolute method, and to examine chemically the gas obtained. The construction of the nitrometer is so simple that the cut hardly needs explanation. In using the apparatus the nozzle of the tap *B* is kept immersed in potash solution contained in the dish, and the tap is turned so that the potash solution is expelled through the nozzle by the incoming gas. When it is desired to read the volume of the gas, the liquid in the two columns is brought to the same level by the use of the three-way tap *B*. The special advantages are: (1) The gas may be readily washed by allowing potash solution to flow through the apparatus, a gentle stream of potash being for this purpose allowed to flow during the combustion from the cup—refilled at intervals—shown at *A*. (2) The work can be accomplished under considerably diminished pressure and an even current of gas readily maintained. (3) The gas may be drawn off for subsequent analysis. (4) The necessity to drive out all the air by first passing carbonic anhydride through the tube, usually practiced in combustions, is completely avoided in the use of this form of nitrometer.—Chem. News, Aug. 26, 1898, 97.

FIG. 56.



Nitrometer.

Liquid Air—Use as Cautery.—The use of liquid air as a cautery is already spoken of favorably. It having a temperature of 312° F. below zero, its action is, to all intents and purposes, the same as that of the most powerful actual cautery. It does not really burn, but utterly kills the tis-

sues, leaving a blister not unlike a burn. According the "Tri-State Medical Journal and Practitioner," a well-known surgeon has already performed a difficult operation on a cancer case with liquid air, and he has reported the case cured.—Pharm. Review, May, 1899, 208; from N. Y. Med. Journ., *69*, 540.

Hyponitrous Acid—Properties.—In connection with his observations on nitrites and hyponitrites (which see) E. Divers describes the properties of hyponitrous acid. In solution, hyponitrous acid is more acid to litmus paper than carbonic acid, but its effect disappears as the paper dries. It decomposes slowly into nitrous oxide and water, and nothing else except a trace of nitrous acid having another origin. When pure it has no action on iodine water or with the starch iodine test. It decomposes silver carbonate, sulphate, nitrate, and chloride, when present in excess, but not the iodide. It is easily oxidized, but is unaffected by reducing agents. It is apparently difficult to obtain it free from every trace of nitrous acid, hence the presence of this when hyponitrous acid undergoes spontaneous decomposition previously noted.—Chem. News, Dec. 23, 1898, 315.

Pure Nitrites and Hyponitrites—Preparation and Properties.—E. Divers observes that alkali nitrites and hyponitrites are easily obtained pure and in concentrated solution by passing nitrous gases containing slight excess of nitric oxide into concentrated solutions of pure potassium or sodium hydroxide or carbonate, out of contact with air. With ordinary care, no nitrate is formed; it is a current mistake to suppose that it is. Both nitrites are slightly yellow, but their concentrated solutions markedly yellow.

Sodium Nitrite melts at 213°; at 15°, six parts of water dissolves five parts of it. Its crystals are often very large, but very thin, flattened prisms, moderately deliquescent. Sodium nitrite can be readily purified by recrystallization;

Potassium Nitrite cannot be purified by recrystallization. It occurs only in minute, short prisms, and is soluble in one-third of its weight of water. It is exceedingly deliquescent, but its crystals are actually anhydrous, although Lang and Hampe independently have found it to contain ½ H_2O.

Hyponitrites.—When potassium or sodium nitrite are acted upon by sodium amalgam, the products of the reduction of the nitrite are nitrous oxide, nitrogen, hydroxylamine, ammonia, hyponitrite of the alkaline base, and sodium hydroxide, but the process can be modified so that each of them in turn shall be formed in any desired quantity between a very small amount and a certain maximum. The principal points needing attention are the degree of concentration of the solution and the temperature at which the reduction takes place. For the preparation of

Sodium Hyponitrite, the most concentrated solution of sodium nitrite is

employed. The hydroxylamine, which always accompanies the sodium hyponitrite, is easily got rid of by the continued action of sodium amalgam, and the resulting ammonia by exposure of the solution over sulphuric acid for a night under reduced pressure. The concentrated solution of sodium hyponitrite and sodium hydroxide thus obtained is remarkably stable. To prepare sodium hyponitrite from this alkaline solution, simple precipitation by alcohol may be resorted to; or, the solution may be evaporated *in vacuo*—as recommended by Jackson—and the residual salt washed with alcohol. Sodium hyponitrite forms minute, crystalline granules—$(NaON)_2+5H_2O$—which effloresce and evolve nitrous oxide in the air, but in a vacuum desiccator are converted into an anhydrous non-coherent powder, which is stable in dry air.

Silver Hyponitrite is prepared by adding a highly dilute solution of silver sulphate or nitrate to the alkaline solution above described. It decomposes exceedingly slowly in the moist state, and is also decomposed by light, becoming browned but not blackened by light alone. When heated, it is decomposed without explosion, its yellow color changing directly to that of metallic silver, without intermediate darkening; the products are silver, silver nitrate, nitrogen, nitric oxide, and nitric peroxide. The author also describes the preparation and properties of mercuric, mercurous, cupric, lead, barium, strontium, calcium, and potassium hyponitrites, in his paper read before the Chemical Society (Nov. 17, 1898).—Chem. News, Dec. 23, 1898, 313–315.

Nitrites—Determination in Water.—L. Robin recommends the following method whereby 0.0001 Gm. of nitrous acid per liter may be determined in water: Fifty Cc. of the water is mixed with 2 Cc. of 20 per cent. solution of chemically pure potassium iodide and 2 Cc. of glacial acetic acid. After standing for exactly 30 minutes, the iodine liberated by the nitrous acid is determined in the customary manner with thiosulphate, starch being used as indicator. In the presence of hydrogen sulphide the water should first be treated with silver sulphate and then distilled, 50 Cc. being collected from 100 Cc. of water taken.—Pharm. Journ., Nov. 26, 1898, 550; Journ. de Pharm. (6), vii., 575.

HALOIDS.

Chlorine—Estimation in Plants.—Berthelot, contrary to the generally accepted opinion that the chlorine in plants is present only in inorganic combination, gives reasons for believing that in part it is also present in organic combination, basing his opinion on the observation made in the course of his experiments that the amount of chlorine is in most cases greater than the amount of sodium necessary for combination. He finds, furthermore, that an accurate determination of chlorine is only possible when the ash-combustion is made in the presence of free oxygen at a dark-red heat, and the vapors evolved are conducted over a long layer of soda.

Under the conditions of ordinary combustion a partial loss of chlorine inevitably results, and this loss may under circumstances be so great as to consume all the chlorine originally present.—Apoth. Ztg., April 19, 1899, 206 ; from Compt. rend., cxxviii., 23–26.

Diluted Hydrochloric Acid—Commercial Quality.—The U. S. Pharm. requires diluted hydrochloric acid to contain 10 per cent. of absolute HCl. Levain H. Brewton estimated the strength of ten samples obtained from wholesale and retail dealers, and found them to contain the following percentages respectively : 10.85, 10.09, 3.70, 10.20, 10.30, 11.12. 8.68, 9.37 and 11.40.—Amer. Jour. Phar., March, 1899, 142.

Sodium Chloride—Conditions of Dissociation at High Temperatures.—Some years ago Robert Meldrum made a series of experiments in connection with the production of salt vapor, during which he observed that the molten salt was sometimes faintly alkaline, and that the vapor had nearly the same smell as strong hydrochloric acid, but not quite so pungent. This could not be accounted for otherwise than by assuming that the salt underwent decomposition in the absence of aqueous vapor. To settle this question he undertook a series of experiments, the result of which he now briefly describes, which seem to demonstrate that sodium chloride in the absence of water does not form any alkali, even in the presence of such substances as clay, silica, plumbago, manganese dioxide, etc., but that free alkali is formed when it is heated in presence of iron peroxide.—Chem. News, Nov. 4, 1898, 225–226.

Sodium Chlorate—Therapeutic Value and Dose.—Several years ago Brissaud recommended sodium chlorate for the treatment of certain affections of the stomach, and particularly for the relief of cancer of the stomach. Soupault has now made observations in the same direction. He finds that in certain cases of dyspepsia its use is attended with benefit, but that it must be continued for several months. In the case of cancer of the stomach it relieves the pains attending the disease, the inclination to vomit is diminished, and eventually disappears. He does not, however, find the administration of sodium chlorate to be free from danger. The maximal dose of 8 grammes per day should not be exceeded, since in larger doses its action may become toxic ; albuminuria may be produced, and the property of converting hæmoglobin into methæmoglobin is also attributed to this salt. On the other hand, daily doses of 5 to 8 grammes may be given for months without danger. It is usually given in doses of 2 grammes, dissolved in much fluid, and as remote as possible after meals. —Apoth. Ztg., Nov. 5, 1898, 777 ; from Nouv. Rém., 1898, No. 18.

Perchlorates—Electrolytic Preparation.—F. Winteler states that the prolonged electrolysis of the alkali chlorides, or those of the alkaline earths, in aqueous solution with platinum electrodes, may give rise to the formation, not only of hypochlorites and chlorates, but also of perchlorates.

When the electrolysis of the solutions of the chlorides between the platinum electrodes has arrived at such a point that all the chloride is transformed into chlorate, the best conditions for the further oxidation of the chlorate into perchlorate are: (1) The solution must be acid at the anode; (2) the temperature must be low at the anode; (3) the density of the current must be from 4 to 12 ampéres per square decimeter; and (4), the electrolyte should be a saturated solution. Thus, if we electrolyze, without a diaphragm, a neutral solution of potassium chlorate saturated at the ordinary temperature, with 8 ampéres per square decimeter, taking care to maintain the bath at 10° by means of a current of water, we find that at the commencement 73 per cent. of the oxygen which should be disengaged is utilized in transforming the chlorate into perchlorate. A saturated solution of sodium chlorate, 1 : 1, gives under the same circumstances a return of 93 per cent. of sodium perchlorate. The return only commences to diminish at the moment when the chlorate is almost entirely oxidized, and then diminishes rapidly. It is of importance to cool the electrodes immediately. Reduction of the chloride does not take place at all, even when a very weak current is employed.—Chem. News, March 3, 1899, 97; from Chem. Ztg., 1898, xxii., 90.

Perchlorate in Chili Saltpetre—Estimation.—C. Ahrens and P. Hell recommends the following method for estimating the perchlorate in Chili saltpetre as being sufficiently rapid and exact for commercial analysis: Twenty Gm. of the well powdered sample are placed in a platinum crucible and moistened with 2 or 3 Cc. of a cold saturated solution of sodium carbonate, add 1 Gm. of manganese dioxide free from chlorine and evaporate to dryness. The mass is brought to fusing point, and the crucible, which must be well covered, is kept at a red heat for fifteen minutes. The product of this fusion is, after cooling, dissolved in 100 Cc. of boiling water, the solution is cooled and made up to 250 Cc.; of this when filtered 50 Cc. are taken (equal to 4 Gm. of the sample), acidulate with 10 or 15 Cc. of nitric acid of 1.2 density, then add a 1 per cent. solution of potassium permanganate until the red color lasts for at least a minute. Ferrous sulphate is then added and the solution titrated by Volhard's method. The chlorine being also determined in 4 Gm. of the original sample, by Volhard's method, the amount of chlorine which exists in the saltpetre as perchlorate is calculated by the difference between the number of Cc. of decinormal argentic nitrate solution employed before and after fusion.—Chem. News, March 10, 1899, 110; from Zeits. f. Offentl. Ch., iv., 445.

O. Foerster, who has experimented in the same direction, observes that in the usual methods of estimating chlorates and perchlorates in saltpetre, exact results are not obtained—probably on account of the loss of chlorine or partial volatilization of the alkali chloride by the high heat employed. He finds the following method to give accurate results and to be free from the objections mentioned: 10 Gm. of the saltpetre are mixed with 10 Gm

of anhydrous sodium carbonate free from chlorine, and the mixture heated over a strong flame in a covered platinum crucible, or in a large porcelain crucible, until it becomes liquid and no longer gives off gas bubbles; this will not take more than ten minutes. The melted mass does not adhere strongly to the sides, and after cooling is completely dissolved in excess of nitric acid. In the solution thus obtained the total chlorine is estimated in the usual manner.—Chem. News, Dec. 23, 1898, 369; from Chem. Ztg., 1898, 357.

Diluted Hydrobrômic Acid—Commercial Quality.—David K. Bishop titrated ten samples of diluted hydrobromic acid, obtained from wholesale and retail dealers, according to the directions of the United States Pharmacopœia, which requires this preparation to contain 10 per cent. hydrogen bromide. The percentages obtained were as follows: 10.6, 10.4, 10.9, 12.0, 10.1, 13.9, 14.3, 15.0, 14.1 and 12.3.—Amer. Jour. Pharm., March, 1899, 142.

Iodine—Condition and Amount Present in Sea Water.—A. Gautier finds that practically no trace of iodine exists in sea water in the form of inorganic salts, but that it exists in considerable amount in two forms of organic compounds, the one soluble, the other insoluble. The total amount of iodine in a million parts of sea water is 2.32 parts, of which 0.52 parts is present in the form of insoluble organic compounds.—Pharm. Journ., June 10, 1899, 524; from Compt. rend., cxxviii, 1079.

Iodine—Occurrence in Air.—A. Gautier finds that, although iodine is not contained in the air of Paris or at the sea in either the free state or in the form of soluble salts, it is contained in both kinds of air in an insoluble form—being probably combined in microscopic vegetations, such as algæ, lichenes, and spores floating in the air. One thousand liters of Paris air contained 0.0013 milligramme of this combined iodine, and the same quantity of sea air contained 0.0167 milligramme. Specimens of fine dust and lichenoid incrustations collected on the Pantheon at Paris at various heights of 40 and 77 meters, contained 0.066 and 0.551 parts of iodine per million.—Pharm. Journ., April 29, 1899, 383; from Compt. rend., cxxviii, 643.

Iodine—A Constituent of Blood.—Gley states that iodine is found in the blood of all adult animals, but that it is not found in the blood of newborn animals. The new corpuscles are the seat of the iodine compound, and this is the source of the iodine present in the thyroid gland, to which attention was first called by Bauman.—Pharm. Journ., Dec. 31, 1898, 689; from Nouv. Rém., xiv., 418.

Iodides.—A Highly Sensitive Reagent Paper.—Professor Bourget recommends a very sensitive test-paper for the detection of traces of iodides in sputum and in urine, which is prepared as follows: Filter paper is immersed in a 5 per cent. solution of starch and dried; it is then cut into

pieces about 5 Cm. square, 2 to 3 drops of a 5 per cent. solution of ammonium persulphate are dropped into the centre of each square, and the paper is then again dried with exclusion of bright daylight. When this paper is immersed in liquids containing traces of an iodide, an intense blue color is developed, and this reaction manifests itself distinctly even in solutions containing 0.00005 per cent. of potassium iodide. The persulphates of sodium and potassium do not produce a paper as sensitive as that prepared with the ammonium salt.—Apoth. Ztg., Aug. 17, 1898, 577.

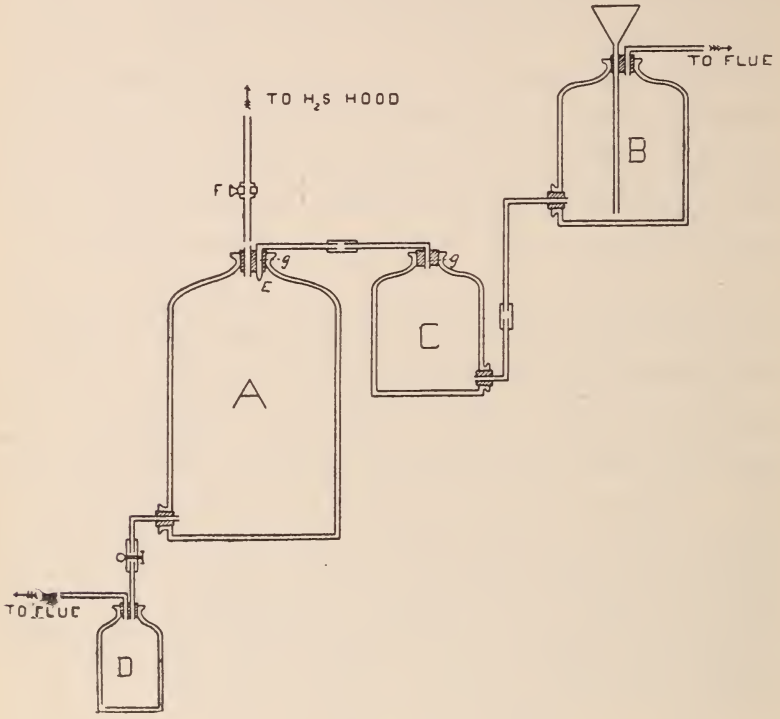
Fluosilicic Acid—Preparation for the Manufacture of Tartaric Acid.—In connection with his new method for the manufacture of tartaric acid (see under "Organic Chemistry"), Dr. G. Scarlata describes the following process and apparatus for the preparation of the fluosilicic acid necessary for the operation. The apparatus consists of a cast-iron pot fitted with a mechanical stirrer, in which the raw material (potassium fluosilicate) obtained as a by-product from a previous operation is placed. The calculated quantity of concentrated sulphuric acid is added, the cover is luted on, and the whole heated and stirred continuously. The cover has two tubes passing through it; the first—which is for passing a current of air through at the end of the operation—is kept closed by means of a tap during the first phase of the operation; the second—which is much larger—is for the purpose of passing the fluoride of silicon into a vessel filled with water. The water necessary for the decomposition of the fluoride of silicon is added, the quantity is estimated approximately by the quantity of potassium fluosilicate present, so that the solution of fluosilicic acid can be prepared of practically any desired strength. The fluoride of silicon, on entering the vessel, comes in contact with the water, which decomposes it into fluosilicic acid and gelatinous silica.—Chem. News, June 23, 1899, 296; from Monit. Scient., (3) xiii., May, 1899.

SULPHUR.

Hydrogen Sulphide—Simple Contrivance to Facilitate Precipitation.—R. E. Meade recommends the following simple contrivance to facilitate hydrogen sulphide precipitation in the copper-arsenic group. A flask or bottle is provided with a bi-perforated rubber stopper, bearing through one of the holes a glass tube reaching to the bottom, for the inlet of the gas, while the other hole bears a small outlet tube, the outer extremity of which is twice bent into a loop. The flask having been connected with the hydrogen sulphide generator with a piece of light rubber-tubing, 1½ to 2 feet in length, the contents of the flask may be shaken frequently and violently during the inflow of gas without danger of any portion being thrown out. The churning up of the solution not alone promotes the rapidity of the precipitation, but causes the sulphides of the metals of the copper-arsenic group to assume a condition which enables them to be more easily filtered off and washed.—Journ. Amer. Chem. Soc., 21, 421.

Hydrogen Sulphide—A Serviceable Generator.—W. P. Bradley describes a new form of hydrogen sulphide generating apparatus (see Fig. 57) as used in the laboratories of Wesleyan University with perfect satisfaction for the last nine years. It consists of three bottles, *A*, *B* and *C*, each

FIG. 57.



Generator for Hydrogen Sulphide.

provided with an orifice near the bottom. *A* is the generator proper, and has a capacity of about 16 liters and is filled with large lumps of iron sulphide. The generated gas passes through *F* to the hood where as many supply stopcocks may be placed as is desirable. *B* and *C* are the acid supply bottles, although *C* also serves for collecting any excess of generated gas. *C* is connected with *A* by glass tubing which has been drawn out to a fine point at *E* so as not to deliver a jet of acid more than about a pin's thickness. *D* is a flask into which the spent acid may be allowed to run from time to time. The height to which the acid reservoir itself is fixed depends, of course, on the pressure to be overcome by the gas. *B* has a capacity of about 8 liters and *C* about 4 liters, although the size of these flasks may be changed, but their relative sizes should remain about as given. The details of the construction can be seen from the figure. The working of the apparatus is as follows: The gas pressure in

A depends upon the difference in level between the top of the acid in *B* and the mouth of the jet *E*. When this pressure is relieved by drawing gas at *F*, a small quantity of acid flows in at the jet and trickles down through the iron sulphide. As soon as the action is fairly established, gas is produced somewhat in excess of the demand, and forcing back the acid, occupies the top of *C*. On the other hand, when the action slackens, the acid flows forward again, driving before it this accumulation. When the demand ceases entirely, gas continues to form slowly for a time, until the last portion of acid admitted is entirely spent. The gas so formed passes into the reservoir *C*, and fills it from one-third to two-thirds full. Renewed demand for gas is met, of course, at first by this accumulated supply. Among the special advantages attending the use of this generator may be mentioned economy of acid, uniform efficiency, perfect automatism, and consequently the very slight amount of attention required.—Pharm. Review, May, 1899, 211; from Amer. Chem. Journ., 21, 507.

Metallic Sulphides—Action of Ammonium Sulphide—Stauck has studied the action of ammonium sulphide upon metallic sulphides. The sulphides obtained by precipitation were immediately after their preparation heated with white ammonium sulphide in sealed tubes to 150°–200°, and the product examined after cooling.

Silver sulphide was thus obtained in the form of handsome well-formed shining crystals, having the composition Ag_2S.

Thallium sulphide was obtained in similar form; but when the heat was prolonged for three hours, it was obtained in two forms—in thin, six-sided lamellæ, and in needles.

Copper sulphide forms only small quantities of thin, violet-colored, strongly shining lamellæ. *Cadmium* and *zinc sulphide* were converted into crystalline powders. *Mercury sulphide* was converted into cinnabar. The sulphides of *cobalt*, *nickel*, *iron*, *bismuth* and *lead* were not changed.—Apoth. Ztg., Aug. 31, 631; from Arch. d. Pharm., *238*, 1898, No. 3.

Phosphorescent Strontium Sulphides—Composition.—In a former paper José Rodriguez Mourelo had stated that strontium monosulphide is a non-phosphorescent body. He has since studied the causes which determine the phosphorescence of these sulphides, and finds these to be the presence of impurities. Thus, by the reduction by pure carbon of celestine containing calcium sulphate and sodium chloride in addition to strontium sulphate, the resulting sulphide phosphoresces with a dull green color. If artificial strontium sulphate, obtained by precipitating strontium nitrate with a solution of sodium sulphate, is reduced by pure carbon, the strontium sulphide, if pure, gives no phosphorescence, but the phosphorescence begins when sodium sulphate, sodium chloride, and strontium sulphate are added.—Chem. News, Nov. 25, 1898, 267; from Compt. rend., July, 1898, 25.

Strontium Sulphide—Influence of Diffuse and Direct Sunlight.—Continuing his investigation, the author obtained, by the modified method of Verneuil, sulphides of strontium, calcium, barium, and zinc which present a greater and more persistent phosphorescence after exposure to diffused daylight than to the direct rays of the sun for the same period of exposure. In fact, the yellowish green luminosity characteristic of strontium sulphide is never properly obtained from specimens which have been exposed in direct sunlight. The reason is probably that the light waves of greatest amplitude exert the greatest influence, the exciting force in this case being in the invisible portion of the radiation. Radiation from the nearly colorless "Bunsen" flame and from iron heated to a temperature lower than that of redness, is sufficient to produce phosphorescence. One portion of strontium sulphide whilst phosphorescing can excite phosphorescence in another in its neighborhood.—Chem. News, Mar. 30, 1899, 155; from Compt. rend., cxxviii., No. 9 (Feb. 27, 1899).

Magnesium Sulphide.—Preparation and Characters of the Amorphous and the Crystalline Salt.— A. Mourlot prepares amorphous magnesium sulphide by the action of carbon disulphide on magnesium at a red heat. The crystalline form is obtained from this by fusing it in the electric furnace, or it can also be obtained by the action of tin sulphide on anhydrous magnesium chloride. The crystalline sulphide is more stable than the amorphous form, and it resembles crystalline barium sulphide in most of its reactions, but can easily be distinguished from the latter by being non-reducible by carbon.—Chem. News, Nov. 25, 1898, 266; from Compt. rend., July 18, 1898.

Ammonium Dithiocarbonate—A Substitute for Hydrogen Sulphide in Analysis.—In an address delivered at a recent meeting of the German Pharmaceutical Society, M. Vogtherr, after reviewing the faults and inconveniences of hydrogen sulphide in analytical operations, as well as the substitutes for this reagent that have heretofore been proposed, calls attention to a method which depends upon the use of dithiocarbonic acid, HS,CO,SH, in the form of its ammonium salt. This compound—$CO(SNH_4)_2$—is formed when five parts of carbon disulphide are mixed in a glass stoppered flask with nine parts of 20 per cent. ammonia water (or 6–7 parts of 30 per cent.) and allowed to stand with frequent shaking at the ordinary temperature so long as any of the CS_2 is dissolved. The liquid is then neutralized with either nitric or acetic acid until the yellow precipitate of free dithiocarbonic acid produced after each addition is only slowly dissolved; after which the solution is diluted to three or four times its volume with water. The reagent so produced has an orange-yellow color, and an ammoniacal odor only faintly reminding of carbon disulphide. While this reagent affords precipitates with acids, these precipitates are slowly redissolved as long as ammonia is present in excess. The salts of the alkalies, alkaline earths, and earths are not precipitated by the re-

agent, but with those of the heavy metals reactions and precipitates are obtained—under conditions explained by the author—which render the new reagent not only as useful, but in many respects preferable to hydrogen sulphide.—Apoth. Ztg., Sept. 3, 1898, 618–619.

Hyposulphite—Use as Antichlor in Laundry Work.—Prof. F. J. Wulling observes that pharmacists are in a position to advise laundrymen to use antichlor. It is undoubtedly the experience of many who need to resort to the "steam laundries" that their expense for linen, etc., is out of all proportion to what it was when the washerwoman cared for it, though the latter charged more for her work. An inspection of the "rapid method" of a number of laundries put the writer into a position to advise the operators to use a little sodium hyposulphite in their "last water." This salt has no action upon the linen, and by forming new compounds with bleaching solution renders the latter harmless.—Pharm. Era., March 16, 1899, 339.

Sulphurous Acid — Commercial Quality. — John E. Coleman has examined eight samples of sulphurous acid and found them to contain respectively 3.4, 3.45, 0.001, 2.49, 4.3, 1.5, 0.175 and 0.002 per cent. of sulphur dioxide. These results show a considerable deviation even in the best samples from the official percentage—viz., 6.4 per cent. of sulphurous acid gas.—Amer. Jour. Pharm., March, 1899, 144.

Sodium Sulphite—Precaution and Modification of British Pharmacopœia Tests.—D. B. Dott observes that while the British Pharmacopœia recognizes the importance of employing dilute solution of sodium sulphite in estimating the SO_2 by iodine, the test is unfortunately so expressed as to admit of a serious error. In the first place, the result varies greatly according to the rapidity of the titration. In an example when the iodine was added very slowly, 78.74 per cent. was indicated, when added slowly, 85.05 per cent., and when added quickly, 89.46 per cent. was found. Then, also, there is considerable oxidation in the process of the solution of the sulphite, and more if the solution is allowed to stand. The result is distinctly better if the sulphite is powdered than if the crystals are used, because the latter dissolve less quickly. By dissolving in recently boiled, but partially cooled water, and adding the iodine as rapidly as possible, 92.45 per cent. was indicated, but the same solution after a few hours showed only 86.68 per cent. The best results, however, were obtained—95.24 per cent.—by dropping the weighed powder in a known slight excess of iodine solution, dissolving quickly, and titrating the excess of iodine with thiosulphate; the method giving not alone the highest but also the most constant results.—Pharm. Jour., Jan. 21, 1899, 58.

Sulphuric Acid—Industrial Preparation Without the Use of Lead Chambers.—The method pointed out by Berzelius to produce sulphuric anhydride by the direct union of sulphurous acid and oxygen through the

intervention of porous bodies containing platinum (platinated asbestos (?) Rep.), has been in successful use for a number of years. The conditions necessary are careful purification of the sulphurous acid, and careful regulation of the temperature at which the mixed gases produced by roasting and of air are passed over the platinated mass. Simple solution of the anhydride produces acid of any desired strength. — Pharm. Centralh., May 18, 1899, 335; from Ztsch. f. Angew. Chem., 1899.

Sulphuric Acid, U. S. P.—Commercial Quality. — Ernest A. Troth examined seven samples of sulphuric acid purchased from dealers as the official product from as many different manufacturers. Three of the samples were entirely free from impurities, but contained respectively 79.39, 96.68 and 98.6 per cent. of absolute sulphuric acid, the official requirement being 92.5 per cent. Two samples contained a small amount of nitrous acid, and a large amount of hydrochloric acid; another sample, a considerable amount of the latter, and the fourth contained considerable lead. All were free from arsenic, copper and iron. The percentages of absolute acid in the last four samples were respectively 94.03, 91.99, 97.43 and 97.38.—Amer. Jour. Pharm., March, 1899, 143.

Persulphates—Preparation of the Sodium Salt and Therapeutic Uses.— Dr. Rich. Friedlander has employed sodium persulphate with advantage as a substitute for aluminum acetate, potassium chlorate, lysol, etc., in gargles, for the prevention of stomatitis in the inunction treatment, and for bandagings—preferring the sodium over the potassium compound, because of its greater solubility. At his suggestion, Löwenberg has prepared

Sodium Persulphate, as follows: A concentrated solution of sodium sulphate and a diluted solution of sulphuric acid, separated from each other by a porous diaphragm—a clay cylinder—are so arranged that the positive pole of an electric battery dips into the saline solution in form of platinum wire, while the negative pole is joined to a sheet of platinum immersed in the acid solution. By electrolysis sodium persulphate ($Na_2S_2O_8$) is formed in the saline solution, a necessary precaution being that the solution be neutralized from time to time so as to overcome too great acidity —sodium sulphate being then simultaneously produced for the next operation. The sodium persulphate so obtained is not absolutely pure, usually containing several per cent. of sodium sulphate, but answers the purposes for which it is intended admirably. It is a white, crystalline, odorless powder, which in the presence of water easily decomposes according to the equation—$Na_2S_2O_8+H_2O=Na_2SO_4+H_2SO_4+O$. Its therapeutic energy depends upon the production of free sulphuric acid and oxygen. It is not to be understood, however, that its aqueous solutions are not stable under ordinary conditions. The salt is readily soluble in water, and its solutions keep unchanged for weeks unless they be heated or in contact with easily oxidizable bodies—Therap. Monatsh., 1899, 99; Apoth. Ztg., Feb. 4, 1899, 66.

SELENIUM AND TELLURIUM.

Selenium and Tellurium—New Compounds.—R. Metzner has carried out an exhaustive study of the compounds of selenium and tellurium. Among various new compounds he has prepared two hydrates of selenic acid, well-crystallized selenious-sulphate, two oxyfluorides and the fluoride of tellurium, a compound of tellurium bichloride and phosphorus perchloride, etc., and he gives methods for preparing selenic acid in large quantities, either by the electrolysis of copper selenate or by oxidizing selenous acid by means of permanganic. In the case of tellurium he was able to redetermine the atomic weight by two methods, and gives it as 127.9.—Pharm. Journ., Nov. 26, 1898, 545; from Amer. de Chim. et de Phys., xv, 203.

Ammonium Selenide—A Black Crystalline Modification.—When ammonium selenide is produced by the interaction of ammonia and hydrogen selenide, as suggested by Bineau, the compound is a white crystalline solid and is readily decomposed by water in the presence of air. It has now been obtained in the form of black, anhydrous, ortho-rhombic prisms, by V. Lehner and E. F. Smith, by saturating an ammoniacal solution of ammonium molybdate with gaseous hydrogen selenide and carefully concentrating the dark red solution produced in a vacuum over sulphuric acid. The residue consisted of free selenium, ammonium molybdate, and the crystals of black ammonium selenide. These, when separated as completely as possible from the selenium and extracted with carbon disulphide, proved to be stable in air and dissolved readily in water, but the solution on exposure to air is decomposed with separation of black selenium. Other metallic selenides may be prepared by adding the freshly made solution of this ammonium selenide to the desired metallic salt either in neutral or alkaline solution.—Journ. Amer. Chem. Soc., xx, 277.

Selenate of Copper—Preparation and Properties.—R. Metzner prepared selenate of copper as follows: Selenium was first converted into selenious acid—H_2SeO_3—by the usual method. This was oxidized by a current of chlorine, operating on a solution containing not more than 10 per cent. of the acid. The resultant mixture of selenic acid—H_2SeO_4—and hydrochloric acid was then neutralized with pure oxide of copper, that made by precipitation from the nitrate being superior for this purpose to the calcined article. The copper selenate is readily separated from the deliquescent chloride of copper by concentration, crystallization, and recrystallization, forming beautiful prisms of a blue color. Selenate of copper is found to be more soluble in hot than in cold water, one liter dissolving 257 Gm. at 15°, 346 Gm. at 35°, and 435 Gm. at 55°; but at higher temperatures, towards 70°, the salt decomposes. When dissolved in warm selenic acid, diluted with three or four times its volume of water, the selenate deposits in pale blue striated crystals, which have the same

composition as the original salt; but when the amount of acid is very much augmented, the selenate is deposited in a white granular form, showing under the lens the form of transparent tubular crystals. These correspond to the formula $CuO,SeO_3,2H_2O$. At 100° they lose 1 mol. of water, and the compound CuO,SeO_3,H_2O remains. The author has found the pure selenate of copper to yield very pure

Selenic Acid by an electrolytic method which he describes. It is possible by this method to obtain it free from copper, chlorine, and selenium, conditions which are very difficult to attain by the ordinary methods of its production.—Chem. News, Sept. 30, 1898, 165–166; from Compt rend., cxxvii., No. 1.

PHOSPHORUS.

Phosphorus—Estimation in Phosphides.—In the course of his researches on the compounds of phosphorus and aluminum, Léon Frank found considerable difficulty in estimating the phosphorus, owing to the fact that aluminum phosphides are very unstable in air. He has since devised a method which gives very accurate results. It depends on the oxidation of the evolved PH_3 by means of bromine, and the estimation of the phosphoric acid formed. The phosphide is contained in a vessel connected with three tubes containing a saturated solution of bromine in hydrochloric acid. Dilute sulphuric acid is dropped, from a dropping funnel, on to the phosphide, and the evolved gas passed into the bromine solution. The vessel containing the phosphide is connected with a Kipp's apparatus, evolving CO_2, by which the air is first driven out and afterwards the PH_3 into the bromine solution. The phosphoric acid in the three tubes is estimated in the usual way.—Chem. News, Aug. 5, 1898, 63; from Zeit. Anal. Chem., xxxvii.

Phosphorus—Determination in Phosphorus Pastes, etc.—Lester Reed proposes the process described below for determining the quantity of free phosphorus in phosphorus pastes, etc., which depends upon the discharge of the color of a solution of bromine in carbon disulphide when gradually added to one of phosphorus in the same liquid. A solution of bromine containing 0.5 to 1 Gm. in 50 Cc. carbon disulphide is standardized by a weighed quantity of yellow phosphorus in 20 Cc. carbon disulphide. This operation is conducted in a glass-stoppered bottle containing about 1 Cc. of paste made of flour, glucose and water, and 5 Cc. of absolute alcohol, thus imitating the conditions of the actual determination. The solution of phosphorus is added next, and then the bromine solution gradually from a bottle, until a permanent yellow color is produced in the floating layer. A weighed quantity of the sample to be examined is then placed into a similar bottle, 5 Cc. of absolute alcohol added, then 20 Cc. carbon disulphide, and the titration is conducted as before. The ratio of phosphorus and bromine consumed in this reaction appears to stand to each

other, in the presence of a little alcohol and water, in the proportion of $P : Br_5$. In presence of phosphites, resulting from the oxidation of the phosphorus in the paste, a correctiom must be made by deducting the quantity of bromine solution that is decolorized by a filtered extract of the parts made with cold 50 per cent. alcohol.—Pharm. Journ., Feb. 25, 1899, 163; from Analyst, *24*, 33.

Calcium Phosphide—Production in Crystals.—H. Moissan has succeeded in obtaining calcium phosphide in the form of minute, deep red crystals, by carefully heating a mixture of calcium phosphate and lampblack in the electric furnace. These crystals have the composition Ca_3P_2. The same body was obtained in an amorphous condition by heating metallic calcium and phosphorus together in vacuo. As is the case with other binary combinations of calcium, this compound is readily decomposed by water; hydrogen phosphide is evolved. It will be remembered that under the same conditions calcium hydride evolves hydrogen, calcium carbide gives off acetylene, ammonia is evolved from calcium nitride, etc., etc.—Pharm. Journ., June 3, 1899, 503; from Compt. rend., cxxix., 787.

Magnesium Phosphide—Properties.—Henri Gautier finds that by the direct combination of magnesium and phosphorus a phosphide, having the formula Mg_3P_2, is obtained. This compound is decomposed by water very easily, giving off pure gaseous hydrogen phosphide. It possesses very great chemical activity, acting easily on oxygen, chlorine, etc.—Chem. News, June 9, 1899, 276; from Compt. rend., cxxviii., No. 19 (May 8, 1899).

Diluted Hypophosphorous Acid—Commercial Quality.—Ralph L. Haus examined five samples of diluted hypophosphorous acid purchased from different dealers. He found them to conform with the official description in their physical properties, but when titrated by the U.S. Pharm. method for total acidity, they were found to vary greatly from the official standard (10 per cent.) with a single exception, the results being as follows: 16.0, 11.0, 16.1, 10.1 and 14.5 per cent. respectively. Titrated by the indirect potassium permanganate method of the Pharmacopœia, the percentages shown in the same order were as follows: 15, 10, 16, 9 and 14 per cent.—Amer. Journ. Pharm., March, 1899, 143.

Hypophosphites—Improved Method of Assay and Characters.—H. A. D. Jowett, after reviewing the different methods that are in use, or have been proposed for the assay of the hypophosphites, calls attention to the failure of any and all of them to give satisfactory evidence of accuracy. Furthermore, in every method except a single one, that of Tyrer, no notice is taken of the well-known fact that the chief impurity present—phosphite—will behave in a similar manner to oxidizing agents as the hypophosphite. Any method to be accurate must either be uninfluenced by any impurities present, or the disturbing impurities must first be removed.

The latter condition is effected in Tyrer's method by the use of barium chloride, but is not completely effective, owing to the slight solubility of barium phosphite in water. Mr. Jowett proposes instead of barium chloride the use of lead acetate for the removal of the impurities, the lead phosphite and other impurities being insoluble in water. The excess of lead is then removed by hydrogen sulphide, and the filtrate containing the now pure hypophosphite completely oxidized to phosphate, which is determined either gravimetically or volumetrically by the usual method of analysis. The accuracy of the method has been satisfactorily proven by the analysis of pure material and of mixtures of pure material with known amounts of likely impurities. The author's investigations were extended to the preparation of, and examination into, the characters and properties of some pure salts, including the hypophosphite of iron, and a complete examination of the principal salts of the leading British and American manufacturers, with results which will prove highly interesting, and which led him to suggest as worthy of the consideration of various Pharmacopœia Revision Committees the necessity of a thorough revision of the tests for these salts, and of fixing some standard, which might be as follows: For the calcium and barium salts, 98 per cent.; for the sodium and potassium salts, 96 per cent.; for the ferric salt, 95 per cent.—Proc. Brit. Pharm. Conf., 1898, 409–424.

Diluted Phosphoric Acid—Commercial Quality.—In an examination of twelve samples of diluted phosphoric acid obtained from different sources, only one was found that failed to respond to the physical official character; it was milky-white and had a disagreeable odor. It was also the only sample that showed the presence of chlorides, phosphates and heavy metals. All were free from nitric and phosphorous acid. Three contained sulphates, among them the impure sample mentioned. The percentages of phosphoric acid found were as follows: 10.5, 11.0, 10.0, 16.5, 10.9, 5.0, 10.0, 19.5, 24.0, 22.5, 8.5, and 7.3, the official requirement being 10 per cent. of absolute acid.—Amer. Journ. Pharm , Mar., 1899, 143.

Tricalcic Phosphate and Apatite—Solubility in Water.—The question of the solubility of tricalcic phosphate in water being one of great interest to chemists as well as those engaged in agriculture, Jules Joffre has made experiments with the view to its determination. He placed the phosphate in water for about two months, then filtered, and, after evaporation, the phosphoric acid was estimated as ammonium phospho-molybdate. There is good reason to believe that two months is a long enough time for contact with water; for, after a submergence of several years, the author found analogous figures. The coefficient of solubility is found to be 0.009 Gm. per liter. As carbonic acid is always present in the soil, the author made further experiments with water saturated with carbonic acid at the normal temperature, and found that the coefficient of solubility was 0.153 Gm. per liter. He next made similar experiments with apatite,

both in pure water and in water charged with carbonic acid. In pure water there was only 0.002 Gm. per liter dissolved, and in water saturated with carbonic acid, 0.014 Gm. per liter.—Chem. News, Dec. 9, 1898, 291 ; from Bulletin de la Société Chimique (3) xx, No. 9.

Sodium Pyrophosphate—Conditions of Compatibility with Ferric Chloride.—P. Jansen calls attention to the prescription of a physician constructed as follows: Liq. ferri sesquichlorati, 5.0; natr. pyrophosph., 13.0: aqua dest., 200.0. In the hands of different operators the mixture made from identical ingredients differed very materially in appearance, a turbid, sometimes brownish mixture being usually produced. If the two medicinal agents are dissolved in 100.0 of water each, and the two solutions are mixed *cold*, by adding the ferric solution to that of the pyrophosphate a milky mixture is at first produced, but becomes clear and light green in color after a short time, a soluble sodium-iron pyrophosphate being formed.—Apoth. Zeit., July 20, 1898, 507.

SILICON.

Silica—Colorimetric Method of Estimation in Water.—A. Jolles and F. Neurath base a new colorimetric test for the presence of silica in potable waters upon the formation of potassium silico-molybdate, the pronounced yellow color of which increases in intensity with the temperature, and reaches its maximum towards 70° or 80°. For this purpose they use a solution of potassium molybdate, prepared by dissolving 8 Gm. of the salt in 50 Cc. of water and adding 50 Cc. of nitric acid, sp. gr. 1.42. Twenty Cc. of the water to be examined is placed into a narrow test tube, in which it will stand about 18 Cm. high, and 1 Cc. of the reagent is added. The color is noted and compared with a colorimetric scale produced by a series of such tubes containing known quantities of silica in the same quantity of pure distilled water and reagent, and standing at the same height—the final comparison being made after all the tubes have been heated together to 80° C. Approximately correct estimates are then readily obtained.—Zeitschr. f. Angew. Chem., 1898, 315.

Amorphous Silica—Preparation and Properties of the Hydrate.—Robert Meldrum prepared a sample of SiO_2 by adding 200 Cc. strong HCl to 200 Cc. of commercial sodium silicate of sp. gr. 1.526, containing 12.87 per cent. Na_2O and 31.98 per cent. SiO_2. The mass was constantly stirred for thirty minutes, so as to allow the acid to thoroughly penetrate the thick gelatinous mixture, the yellow liquid decanted, and the SiO_2 washed repeatedly with boiling water until free from chlorine. After drying slowly in the air for a week, the resulting product was a snow-white, granular, coarse powder, very porous and light. Three determinations of the loss on ignition, at red heat, gave 30.4, 30.5, 30.35—average 30.41 per cent. After drying over sulphuric acid, until weight remained constant, lost 22.90 per cent., = 9.74 per cent. H_2O in desiccated SiO_2. The

specific gravity of the anhydrous silica was found to be 1.990, 2.0964; of the air-dry, 2.0543. Loss of air-dry at 100° C.= 24.75 per cent. = 7.52 per cent. H_2O in residue. When strongly ignited for thirty minutes over blow-pipe, digested in water for twenty-four hours, allowed to dry in air until weight remained constant, absorbed parts per 100, 4.05, 4.65. Another portion of the strongly ignited sample, exposed to a moist atmosphere, absorbed 6.85 parts per 100. Under slightly modified conditions other samples of an amorphous silica were prepared—all the samples being washed until free from gelatinous silica. As the result of his investigation, the author notes that the only products approaching a definite hydrate are those resulting from the dehydration of the air-dry silica over H_2SO_4, which agree closely with the formula $3SiO_2H_2O$. This confirms Merz's observation that the same hydrate is formed by prolonged drying of precipitated SiO_2 over H_2SO_4.—Chem. News, Nov. 11, 1898, 235–236.

Infusorial Earths—Possible Pharmaceutical Uses, etc.—The recent occasional demand by pharmacists for infusorial earths, and the diversity of these earths among themselves, has elicited a paper from Mr. John Moss at the meeting of the British Pharmaceutical Conference in 1898, in which he calls attention to their distinctive characters, the uses to which they have been put in the arts, and the possible uses in pharmacy. The best known of these diatomous or infusorial earths is that found in Hanover in immense deposits, which is commercially known under the German name of

Kieselguhr, a name which means siliceous deposit; but similar infusorial earths are found in many other parts of the earth: in Scotland (in the island of Mull), in the United States (underlying the whole city of Richmond, Va.) in Australasia, in Norway, France, Algeria, etc. The immensity of these deposits may be conjectured from the fact that in Victoria these diatomous deposits are not less than 400 miles long and 120 miles broad, and that they extend to a depth of from 200 to 400 feet. An examination of eight different specimens of infusorial earth, obtained from as many different sources, shows important variations in composition. In no case does the silica (SiO_2) exceed 96 per cent., and it falls as low as 70 per cent., the difference being made up by moisture, organic matter, ferric oxide and alumina. Consisting of the siliceous envelope of *diatomaceæ*, a family of minute uni-cellular plants, the author regards the name

Diatomite as the one most generally appropriate to designate these various forms of siliceous earth. As exhibited under the microscope, the various diatomes are among the most interesting and attractive objects, usually most perfectly symmetrical and elaborately marked in patterns of great delicacy. In the course of his examinations Mr. Moss has recognized a large number of individual species, which he enumerates, and which may serve for the identification of specimens from different sources. When the natural diatomite is completely calcined, the organic

matter contained in these diatomes is destroyed and the calcined diatomite then constitutes purely and simply silica, contaminated only with such inorganic impurities as may be originally associated with it, such as iron, alumina, &c. Thus commercial calcined "kieselguhr" varies in color from a very pale cream to a reddish tinge, according to the amount of iron associated, and contains as much as 95 per cent. or more of pure silica.

After briefly reviewing the technical uses to which diatomite has been put in recent years, such as the preparation of dynamite, of so-called "dry sulphuric acid," of disinfecting powder, etc., all of which are owing to its remarkable power to absorb moisture, Mr. Moss calls attention to its value as a filtering medium in pharmaceutical operations. Provided that the diatomite is free from organic matter, it seems to possess all needful qualities for clarifying liquid galenicals and certain solutions of salts and acids. Being absolutely indifferent to all but the strongest alkalies at a high temperature, it may be used with impunity in all of the ordinary filtering operations required in pharmacy. It possesses the advantage over talc or asbestos that it does not clog up the filtering bag, and filtration is consequently rapid and at the same time perfect. A disadvantage is the difficulty with which it mixes with liquids. It should be worked down in a mortar with a little of the liquid to be filtered, so as to form a smooth thin paste: this can be mixed with more of the liquid to start the filter. If this is carefully done, the filter sets at once, and very little of the filtrate will have to be returned. Other uses are suggested, such as the preparation of tooth-powder, tooth-paste, dusting powder, etc. On account of its power of absorbing moisture, it may possibly also serve a useful purpose in dispensing hygroscopic substances—such substances remaining pulverulent when mixed with it. There can possibly be no objection to this on the ground of noxious qualities, since it is known that the Norwegian peasantry have been compelled to eat quantities of infusorial earth in times of scarcity of food or famine.—Proc. Brit. Pharm. Conf., 1898, 337–345.

White Calcined Infusorial Earth—Presence of Iron.—Feodor Miehle, in view of the recent introduction of infusorial earth as a filtering medium, subjected two commercial samples of the white calcined article of commerce to examination, and found both to yield iron to boiling dilute hydrochloric acid. One of the samples also contained a considerable admixture of sand. For the intended purpose, it is desirable that both sand and iron should be eliminated. The iron should, at all events, be removed by treatment with boiling dilute hydrochloric acid, and washing with water. The sand may be removed by subsequent levigation.—Apoth. Ztg., April 26, 1899, 222.

BORON.

Boric Acid—Volumetric Determination.—In the course of the analyses

of several new borates of sodium and barium, prepared by himself, Copaux employed with advantage the volumetric method suggested by R. Thomson and Barthe, which, briefly expressed, is as follows: The alkali in the boric compound is titrated with acid, using helianthin as indicator; the liquid is then mixed with ⅓ its volume of glycerin, and the boric acid titrated with sodium hydrate, using phenolphthalein as indicator. The author finds that it is an advantage when the titre of the alkali is not determined by a strong acid, but instead by pure dry boric acid $B(OH)_3$, under the same conditions of concentration in which they are used in the analysis itself. The method is equally applicable to the determination of boron in the boric acid esters, when the titration is made with alcoholic sodium hydrate and this standardized with boric acid dissolved in alcohol. —Apoth. Ztg., Febr. 4, 1899, 58; from Compt. rend. cxxvii., 756–759.

Boric Acid—Insolubility in Vaselin.—Feodor Miehle has repeated the experiment under which v. d. Wielen believed he had established the solubility of boric acid in hot vaselin, and finds it to be absolutely insoluble. 10 Gm. vaselin and 0.2 Gm. powdered boric acid were heated in a sulphuric acid bath at 120°–160°, for several hours. Under these conditions the boric acid melts, loses water, and adheres to the bottom of of the glass or porcelain vessel in form of a glassy mass. The supernatant vaselin when tested for boric acid on platinum wire in the flame of a Bunsen burner does not give the faintest indication of a green flame, showing the complete absence of boric acid. Evidently v. d. Wielen failed to observe the glassy deposit of boric acid produced in his experiment.—Apoth. Ztg., Nov. 2, 1898, 768.

CARBON.

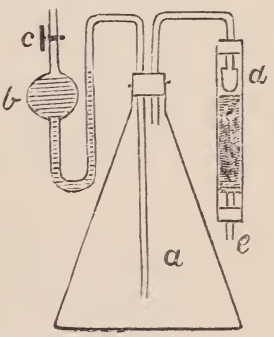
Carbonic Oxide—Decomposition in Presence of Metallic Oxides.—O. Boudonard has investigated the decomposition of carbonic oxide by oxide of iron and the oxides of nickel and cobalt. At a temperature of 455° he finds that the carbonic oxide is totally decomposed by these oxides if that temperature is maintained for a sufficient time; but in the case of the oxides of nickel and cobalt, the time necessary to arrive at the same results is shorter than in the case of iron.—Chem. News, March 10, 1899, 117; from Compt. rend., cxxviii., No. 5 (Jan. 30, 1899).

Carbonic Oxide—New Method of Estimation.—Schlagdenhauffen and Paget find that the oxides of silver and copper when heated in a current of carbonic oxide are completely reduced—the silver oxide at 60°, the copper oxide at 300°—and can consequently be used to absorb the gas quantitatively. As the carbon dioxide formed theoretically corresponds to the oxygen lost, it follows that the reaction can be used for the estimation of carbonic oxide.—Chem. News, March 10, 1899, 117; from Compt. rend., cxxviii., No. 5 (Jan. 30, 1899).

Carbonic Oxide—Production by the Action of Alkali Solutions on Chloroform, which see under "Organic Chemistry."

Carbon Dioxide—Simple Apparatus for its Estimation.—W. H. Baker has constructed and used with advantage the apparatus for the estimation of carbon dioxide shown by Fig. 58. A conical-shaped flask, *a*, is fitted with a bi-perforated cork. Through one of the holes a bulb tube, bent as shown in the cut, reaches to near the bottom of the flask, its outer extremity being surmounted by a rubber tube provided with a clip, *c*, the bulb, *b*, being filled with acid. Through the other hole of the cork a bent glass tube is inserted, connected by a cork with a straight calcium chloride tube, in the upper part of which a piece of the closed end of a test tube, *d*, is placed, to catch the drippings of moisture, and thus prevent the $CaCl_2$ with which the rest of the tube is filled from becoming unneccessarily moist. The carbonate having been placed in the flask, a rubber tube is attached at *e*, the clip *c* is opened, suction applied, and quickly closed. The bent tube with the bulb containing the acid now acts as a syphon, and, therefore, by means of the clip, the flow of the acid into the flask can be regulated. The analysis is completed by warming the flask and aspirating through the apparatus by suction through the rubber tube, which is removed before the final weighing is made.

FIG. 58.



Carbonic Acid—Compounds with Water, Ether, and Alcohols.—Hempel and Seidel have obtained a crystalline compound CO_2+8H_2O by cooling solid carbon dioxide with water to —79°; under other conditions, the compound CO_2+9H_2O. Under ordinary atmospheric pressure these compounds decompose at —2°, but under a pressure of 43 not below 8° C. When solid carbon dioxide is added to ether containing water, a crystalline compound of variable quantities of the three substances is obtained, With the alcohols liquid carbon dioxide added in molecular proportions produces, under condensation, the mono-ethyl, mono-methyl, or mono-amyl ester of carbonic acid, according to the alcohol used. They all congeal at low temperatures.—Apoth. Ztg., Feb. 1, 1899, 60.

Carbonic Acid—Determination and Amount in Air.—Albert Lévy and H. Henriet communicate the results of experiments made to determine the amount of carbonic acid in the atmospheric air, covering a period of six years. They found that by allowing the air to bubble through a dilute solution of potash or baryta, the free CO_2 is retained absolutely and completely by the potash as well as by other caustic alkalies, and that the amount of carbonic acid during the period named varied very slightly.

being at no time, either by day or night, more than half a liter in 100 cubic meters of air.—Chem. News, Dec. 2, 1898, 279; from Compt. rend., cxxvii., No. 7 (Aug. 15, 1898).

Carbonic Acid—Method of Absorbing Small Quantities from Air.—Marboutin, Pecaul and Bouyssy have successfully used the following arrangement for completely absorbing the carbonic acid in atmospheric air: The air is made to circulate through an almost horizontal tube, 0.8 meter in length and 11 Mm. in diameter, containing 50 Cc. of a solution of potassic hydrate at 20 Gm. per liter, the bubbles of gas joined together and passed through with a speed of about 4 liters per hour, being in contact with the absorbing liquid for at least fifteen to twenty seconds. A second identical tube, placed in continuation of the first, never showed the least trace of carbonation, either with potash or baryta, even after the passage of 200 liters of air. The alkalinity of the second tube was identical with that of the solution used.—Chem. News, May 12, 1899; from Bull. Soc. Chim. (3) xxi–xxii, No. 1.

Carbonic Anhydride—Determination in "*Magnesia,*" which see.

CYANOGEN.

Hydrocyanic Acid—Distribution in Plants.—Hébert communicates the results of a wide series of experiments made to determine what plants contain or yield hydrocyanic acid, as well as to ascertain its distribution in the different parts of the plants. It appears from these investigations that the presence of the acid or of bodies resembling amygdalin is practically confined to those parts which contain chlorophyll. The young green buds of *ribes rubrum* gave a few milligrams of the acid for 100 grammes, but the fully developed growing parts gave none. Traces were also found under like conditions in *ribes nigrum* and *ribes aureum*. Many rosaceous plants yield the acid, but it is not found in the cultivated plants of the genus *rosa*. No trace of the acid is found in any member of the family of the *aroidæ*. The embryo of the seeds of the Japanese medlar, *eryobothris japonica*, yields about 0.04 per cent., and about the same amount is contained, as an amygdalin-like body, in the young plants of *aquilegia vulgaris*, while the flowers of the latter contain a smaller percentage of hydrocyanic acid in the free state. In these it is almost all found in the ovaries.—Pharm. Journ., Aug. 27, 1898, 241; from Rev. Independents, through Nouv. Rém., xiv, 271.

Hydrocyanic Acid—Conditions Affecting its Quantity in Plants.—A. J. van de Vess finds the quantity of hydrocyanic acid in the branches of *prunus lauro-cerasus* to decrease with increase of age. In the young leaves, when just unfolded, the acid occurs only in isolated groups of cells along the principal veins, whereas in the early summer the proportion reaches as much as 2.4 per cent. The author found no trace of hydrocyanic acid in *vicia sativa* or *aquilegia vulgaris*, while A. Hébert found

traces of the acid in the stem-leaves, and leaf-buds of *aquilegia vulgaris* at the commencement of the period of vegetation, and also in the young green shoots of the red and black currant and of *ribes aureum*, and in the embryo of *eryobothris japonica*.—Pharm. Jour., June 24, 1899, 565 ; from Arch. Néerl. Sc. Exact et Nat., 1899, 383.

Diluted Hydrocyanic Acid—Commercial Quality.—Claude R. Middleton examined five commercial samples of diluted hydrocyanic acid obtained from different sources. Contrary to the requirement of the U. S. Pharm., they were all contained in glass stoppered instead of cork stoppered vials, and only one of the vials was of the designated amber-colored glass. Instead of the required 2 per cent. of absolute hydrocyanic acid, the samples contained respectively 1.30, 1.73, 2.80, 1.69 and 1.40 per cent. All the samples were colorless and only one sample left a trace of residue on evaporation.—Amer. Journ. Pharm., March, 1899, 142.

Cuprous Cyanide—New Method of Formation.—Henri Vittenet finds that when 15 Gm. of neutral copper acetate and 30 Gm. of ammonia of 21° B. are heated together in a sealed tube for two hours at a temperature of 180°–185°, the solution is almost entirely discolored, and holds in suspension a mixture of fine spangles of metallic copper, and of white crystalline flakes. On opening the tube no pressure is noticed. The mixture of suspended matter is collected on a filter—the liquid immediately assuming a blue color—and washed with the aid of a filter pump with distilled water until the residue has lost its blue color. It is then digested with water slightly acidulated with H_2SO_4, so as to dissolve the metallic copper. The residual white flakes have been identified with cuprous cyanide obtained by precipitating a hydrochloric acid solution of cuprous chloride with solution of potassium cyanide.—Chem. News, June 23, 1899, 298; from Bull. Soc. Chim. (3), xxi., No. 6.

Ferro- and Ferri-cyanides—Reactions with Various Metals.—Robert Meldrum has studied the reactions of potassium ferro- and ferri-cyanide with the salts of different metals. With *molybdenum salts* the ferri-cyanide gives no reaction either in acid or alkaline solution, even on boiling, while the ferro-cyanide produces in acidulations a deep brown color, discharged again by ammonia. This test is very characteristic, and available to the extent of 1 : 50,000. With *cadmium salts*, the ferro-cyanide produces a white precipitate, unchanged on boiling, soluble in ammonia, but insoluble in dilute acids, while the ferri-cyanide produces a yellow precipitate which is not changed by boiling, and insoluble in sulphuric or acetic acid, but soluble in hydrochloric acid and in ammonia. In solutions of less than 1 : 2000, the precipitate appears white. With *silver salts*, the ferri-cyanide gives a brick-red precipitate, unchanged on boiling and insoluble in acids, but soluble in ammonia. With ferro-cyanide, a white precipitate is produced, unchanged by ammonia, but turning green on boiling, and then brown by ammonia, though insoluble in the latter in either case. With

gold salts, the ferro-cyanide has no reaction in the cold, but yields a green coloration on boiling, which is discharged by ammonia, a yellow precipitate, partly soluble in excess, being formed by ammonia. With ferri-cyanide no reaction is obtained until a few drops of ammonia are added, when a dirty yellow precipitate, insoluble in excess, is formed. With *platinum salts*, the ferri-cyanide has no reaction either in acid or alkaline solutions, or on boiling, but the ferro-cyanide gives heavy crystalline precipitates in 1 per cent. solutions, forming a dark green liquid on boiling, and turning black with ammonia. With *mercuric salts*, the ferri-cyanide gives no reaction in cold solutions, but a dark green color is developed on boiling, and then on dilution and addition of ammonia a dirty yellow precipitate is formed. The ferro-cyanide, on the other hand, produces a white precipitate, becoming yellow with more reagent, and turning a brilliant green on heating and, on addition of ammonia, this changes to flesh color. With *mercurous salts*, the ferri-cyanide produces a light brown precipitate, turned green by boiling, and yellow by ammonia. The ferro-cyanide produces a white precipitate, changing to gray on boiling, and to black by ammonia. *Lead salts* produce no precipitate with ferri-cyanide, but on adding ammonia, a dirty yellow precipitate is produced, which becomes pale yellow on boiling. Ferro-cyanide produces a white precipitate, which is not changed by boiling or by ammonia, and is insoluble in acetic acid. With *zinc salts*, finally, a white precipitate is produced by ferro-cyanide, which is insoluble in ammonia, ammonium chloride, or hydrochloric acid ; while with ferri-cyanide, a yellow "ochre" precipitate is produced, which is soluble both in ammonia and in hydrochloric acid—and a most useful test for zinc salts.—Chem. News, Dec. 2, 1898, 269-270.

Mercuric "Oxycyanide"—A New Antiseptic.—Dr. Guido Jochner calls attention to a new antiseptic agent, which is stated to be mercuric oxycyanide, and is stated to replace mercuric chloride in all operations in surgery and possessing the advantge of being non-corrosive. It is marketed by von Pieverling in the form of pastilles containing 0.5 Gm. of the oxycyanide in a form in which it dissolves readily in distilled water.—Pharm. Centralh., Aug. 18, 1898, 606.

In view of the incomplete information concerning the so-called "oxycyanide" of mercury, the editor of the "Pharm. Centralhalle" addressed Dr. von Pieverling and has ascertained the following characters which distinguish the oxycyanide from the ordinary and well-known mercuric cyanide: The cyanide occurs in well-formed crystals; the oxycyanide constitutes a crystalline powder having a faint tinge of yellow. The cyanide is readily soluble in water and has a neutral reaction; the oxycyanide is sparingly soluble in water, requiring 17 parts, and has an alkaline reaction. Its solution is precipitated by ammonia and by tannic acid, whereas that of mercuric cyanide is not changed by either of these reagents. Both

substances are, however, reduced by solution of stannous chloride, and their mercuric content may by this means be quantitatively estimated. Dr. v. Pieverling fails to give any definite information concerning the composition and method of preparing this new compound, which he places alongside of mercuric chloride in its bactericidal power.—*Ibid.*, Aug. 25, 1898, 616.

Willy Wobbe confirms the paucity of information in standard chemical works on the subject of mercuric oxycyanide. Nevertheless he has thrown some light on the subject which has illuminated the obscurity of the statements of von Pieverling. Thoms in his Medicinal Organic Chemistry, 1897, attributes the formula $Hg(OCy)_2$ to mercuric oxycyanide, while Merck (Index, 1897), gives the formula for this preparation as being $HgOHg(Cy)_2$. The latter formula accords well with the method of its preparation, which consists in dissolving freshly precipitated mercuric oxide in a solution of mercuric cyanide and concentrating the solution to crystallization. Concerning the distinctive characters of reactions given by von Pieverling, the author finds that they must be modified in accordance with the following characterization:

Hydrargyrum oxycyanatum, $HgO.Hg(CN)_2$, forms a microcrystalline, white powder, having a faint yellowish tinge, and a faint alkaline reaction upon sensitive litmus paper. Its solution (1 : 20) is precipitated by tannic acid and reduced by solution of stannous chloride. Ammonia produces a precipitate which is soluble in excess of the precipitant. On addition of sodium phosphate and ammonia a turbidity is produced which disappears when ammonia is added in excess. Its behavior to potassium chromate and ammonia is identical. If a 5 per cent. solution of mercuric oxycyanide is mixed with a 4 per cent. potassium iodide solution, drop by drop, the mixture becomes yellow, and on addition of ammonia, red. After a time a rust-brown deposit forms, which is soluble in excess of potassium iodide. Hydrogen sulphide, as also ammonium sulphide, precipitate black mercuric sulphide from the solutions of the salt.—Pharm. Centralh., Dec. 29, 1898, 934.

Mercuric Oxycyanide—Unsatisfactory Commercial Quality.—Dr. v. Pieverling calls attention to the variable and unsatisfactory character of the mercuric oxycyanide at present supplied by the manufacturers, not only in its chemical composition, but also in its antiseptic and bacteriological value. Even that designated as "purum crystallisatum" was found to be composed of oxycyanide of the formula $HgO.Hg(CN)_2$ and $(3HgO).Hg(CN)_2$; others were mixtures of the first-named oxycyanide and unchanged mercuric cyanide, and yet others were the double salts of mercuric cyanide and the oxycyanide $HgO.Hg(CN)_2$. Unless this compound has the prescribed composition it is not suitable for the purposes of surgery. The author insists that the oxycyanide must respond to the potassium iodide test proposed by him; that is to say, 3 Cc. of solution of mercuric oxycyanide

(1 : 20) must be colored yellow when three drops of potassium iodide solution (1 : 1) are dropped into it from a pipette.—Pharm. Centralh., 1899, 22.

ALKALIES.

Volumetric Acid and Alkali-Standardization.—W. A. Puckner records the results of experiments undertaken with the view to still further simplify, if possible, the methods of the U. S. Pharm. for standardizing volumetric solutions of acid and alkali. The method of the Pharmacopœia which, depends upon the use of *oxalic acid* as the basis in analyses by neutralization, is shown by these experiments to be unsafe as a basis for volumetric work, unless the directions for recrystallization can be changed so as to yield a more constant product. The method of standardizing sulphuric acid as *ammonium sulphate*, suggested by Weinig, is on the whole quite satisfactory, and seems well adapted to the requirements of the pharmacist, the need of maintaining a constant temperature being the only drawback. *Sodium carbonate* is without doubt the most generally used substance for standardizing volumetric acids. The results obtained with this have been exceedingly satisfactory, and it would seem that little objection can be made against the use of sodium carbonate as a means of standardizing volumetric acid, especially when the acid carbonate is converted into carbonate for this purpose. *Borax* as a standard for volumetric acid solution gives values below those accepted as a result of standardization with sodium carbonate or as ammonium sulphate.—Pharm. Archiv., Sept., 1898, 172–184.

Potash—Convenient Estimation in Manures.—E. Wightman Bell, considering the well-known method of final precipitation of potash as the double chloride of platinum and potassium to be the most reliable of the various methods proposed, recommends the following method for its determination in manures, as being considerably shorter, and yielding a purer final product than those commonly recommended: From 5 to 10 Gm. of the sample are well boiled with about 150 Cc. of water, with or without the addition of a little hydrochloric acid. Ammonia is now added in sufficient quantity to produce a slight alkalinity; then, *without filtering*, a considerable excess of barium carbonate (usually about double the weight of manure taken) is added, and the boiling continued for half an hour. The mixture is now filtered, the precipitate washed, and filtrate and washings made up to 500 Cc. Of this, 50 to 100 Cc. are evaporated to dryness with the addition of a small quantity of ammonium oxalate, gently ignited, treated with hot water, and filtered, the filtrate evaporated with hydrochloric acid and platinum chloride, and finished in the usual way. In the case of soils and of vegetable substances, slight modifications are recommended, which see in Chem. News, Mar. 24, 1899, 135.

Commercial Caustic Potash—Substitution of Caustic Soda by Dealers.—Carl E. Smith calls attention to the substitution by some New York dealers of caustic soda for caustic potash, to consumers who are not supposed to test their purchases chemically. On account of the very good appearance of these substitutes the temptation to purchase such is very great, and it probably occasionally finds its way to the stock of pharmacists who do not consider a chemical examination necessary, and its real composition not even suspected. The author has examined five samples, the potash being calculated as sulphate, in accordance with a rule formulated by Fresenius, with results as follows:

	A.	B.	C.	D.	E.
Sodium hydrate	65.9 p. c.	82.8 p. c.	71.6 p. c.	87.0 p. c.	85.2 p. c.
" carbonate	4.75 "	5.3 "	3.18 "	3.7 "	3.18 "
" chloride	17.0 "	7.45 "	4.2 "	2.6 "	5.5 "
" sulphate	1.57 "	2.04 "	9.25 "	2.8 "	2.3 "
" silicate	0.58 "	0.33 "	0.4 "	0.13 "	0.55 "
Potassium sulphate	2.4 "	0.58 "	4.35 "	0.73 "	0.38 "
Water	7.0 "	3.4 "	6.4 "	4.7 "	2.4 "
Insoluble matter	0.21 "	none.	0.17 "	trace.	trace.

On the other hand, the author finds that good potash is at present obtainable in the New York market; indeed, the best crude potash obtainable is not greatly inferior to the standard set by the United States Pharmacopœia for the purified article, as is shown by the results of analysis of a sample, as follows: Potassium hydrate, 86.4 per cent.; sodium hydrate, 1.8 per cent.; potassium carbonate, 4.85 per cent.; potassium chloride, 1.4 per cent.; potassium silicate, 0.1 per cent.; water, 5.55 per cent. The author's observations in connection with the analyses of these alkali hydrates are interesting, and will be consulted with advantage in Amer. Journ. Pharm., Aug., 1898, 392–398.

Metallic Sodium—Action of Sulphur.—The observations of Davy, Gay-Lussac, and Thenard, which have been confirmed recently by the experiments of Rosenfeld, have shown that by the direct action of sulphur upon metallic sodium, the two combine with explosive violence, even at the ordinary temperature. This reaction has been modified in some degree by Rosenfeld by the intervention of sodium chloride, but the product of the reaction appears not to have been analyzed, and is simply stated to be a mixture of monosulphide and polysulphide. James Locke and Alfred Anstell have now succeeded in curbing the reaction by the intervention of toluene, their procedure being as follows: A small weighed quantity of clean sodium was covered with about 50 Cc, of dry toluene, and the latter heated until the sodium fused. This was carried out in a small flask fitted with a return-condenser and a separatory-funnel. Through the latter the calculated quantity of sulphur, dissolved in hot toluene, was slowly added

while the contents of the flask were kept briskly boiling. The reaction at first results only in a thin yellow film of polysulphide being formed upon the surface of the sodium. It soon grows violent, however; the sodium swells up. and a porous cake of the compound is formed. After this main reaction, which lasts but a few seconds, has subsided, the rest of the sulphur solution was added rapidly, and the mixture boiled for about an hour. The product was then filtered, washed with hot toluene, dried, and tested for sodium. The presence of uncombined sulphur in the mother-liquid could readily be seen from the yellow color of the latter. When no free sodium was found, the substance was submitted to analysis. Analytical data obtained show that the only compound formed at 110°, the boiling point of toluene, should approximate rather closely to the formula Na_2S_3. That no lower sulphide is formed is clear, and at this temperature metallic sodium has apparently no action upon the polysulphides. But it is found practically impossible to separate the products from any sodium which may have been unaltered in the reaction, and the results are therefore only approximate.—Chem News, Aug. 26, 1898, 102.

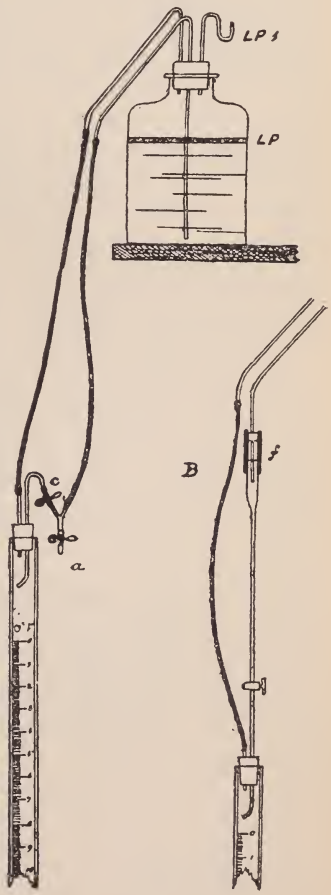
Metallic Sodium—Formation from Sodium Peroxide.—H. Bamberger has succeeded in preparing metallic sodium from sodium peroxide in two ways: the first, by heating an intimate mixture of sodium peroxide and charcoal, well powdered, in a crucible to between 300° and 400°; the second, by heating sodium peroxide and calcium carbide together. In the latter case the reaction takes place with explosive violence, according to the equation $7Na_2O_2 + 2CaC_2 = 2Ca_2O + 4Na_2CO_3 + 3Na_2$. In the first the reaction is simply violent, the sodium being found condensed on cooling on the lid and upper part of the crucible, being formed according to the following equation: $3Na_2O_2 + 2C = 2Na_2CO_3 + Na_2$.—Chem. News, Aug. 26, 1898, 107; from Berichte, 1898, No. 4.

Sodium Peroxide — Use as an Air Purifier. — Desgrez and Balthazard propose the use of sodium peroxide for depriving air of carbon dioxide, the method being probably of special value in the sick room. Vernon Harcourt has shown that the peroxide is readily decomposed by water, with production of sodium hydroxide, oxygen and hydrogen peroxide. The reaction takes place in the cold, and the yield of oxygen is about that of the theoretical requirement, viz., one atom of oxygen for every molecule of sodium peroxide decomposed. The authors have endeavored to utilize not only the oxygen, but also the alkali which is liberated during the decomposition, and experiments have proven that if an animal is immersed in an atmosphere where oxygen is derived from this reaction, the quantity of alkali liberated is more than is required to combine with the carbon dioxide exhaled by the animal. — Pharm. Journ., Mar. 4, 1899, 205; from Compt. rend., cxxviii., 361.

Sodium Oxides—Conditions of Formation From the Metal.—Dr. De For-

crand has studied the product formed by the direct combustion of sodium in dry air free from carbon dioxide, the reaction taking place in a small retort attached to a large globe, through which a slow current of air was passed. Slightly below its fusing-point, the sodium becomes covered with a grey layer, which soon increases in volume if the experiment is stopped at this point. If, however, the heating is continued, the grey substance ignites in the current of air, and the vivid combustion is accompanied by two phenomena: (1) White vapors are produced, which are very volatile and condense only in small quantities in the retort and globe; (2) As the grey substance burns, it is transformed into a yellowish substance, which becomes nearly white on cooling. On analyses of these products, it was found that the grey substance formed at first has the composition Na_3O; the white volatile powder, Na_2O_2; and the white substance, which is yellowish when hot, is a mixture of Na_2O_2 and Na_2O. Na_2O_3 is not formed by this method.—Chem. News, Dec. 9, 1898, 291; from Compt. rend., cxxvii., No. 8 (Aug. 22, 1898.)

Fig. 59.



Sodium Hydrate—Convenient Arrangement for a Continuous Supply of its Volumetric Solution.—In connection with his paper on the Assay of Liquid Extract of Belladonna (which see under "Pharmacy"), F. C. J. Bird describes and recommends the simple continuous supply arrangement for volumetric solution of soda, shown by Fig. 59. It is similar to that recommended by Sutton, but in this modification the supply tube enters at the top of the burette, its end being curved so as to direct the stream of liquid against the side of the burette and prevent the formation of air bubbles. The inflow is regulated by the pinch-cock, *c*. The storage bottle is of green glass, and a little liquid paraffin is placed in the tube *LP'* to form an air valve, a layer of liquid paraffin, *LP*, being also poured on the contents of the bottle. When the apparatus is not in use for several days, the rubber syphon tube is to be emptied by the pinch-cock, *A*, attached to the glass Y-tube. The flexibility of the rubber tubing is a great advantage, but if it be desired to avoid contact of the soda solution with rubber,

the method of connection shown at *B*, which is sufficiently flexible to prevent breakage, may be adopted. The extremity of the supply tube dips into the enlarged extremity of another tube, furnished with a glass stopcock which should be well lubricated with soft paraffin, and communicating with the burette as shown. The joint at *f* is secured by means of a perforated cork and a short piece of rubber tubing of proper calibre. Obviously the arrangement can be used for acid or any other volumetric solution.—Pharm. Journ., May 13, 1899, 434–435.

Sodium Bicarbonate—Temperature of Decomposition.—A recent inquiry as to the temperature at which carbonic anhydride is given off on heating sodium bicarbonate, led W. B. Corvie to refer to the usual authorities for information. Failing to obtain any that was specific, he undertook the investigation of the question himself, selecting for this purpose two specimens of sodium bicarbonate, the purity and quality of which he had previously determined to his satisfaction. His results make it apparent that pure sodium bicarbonate loses carbonic anhydride at a much lower temperature than is usually supposed. Carbonic anhydride begins to be given off when the temperature is between 52°6 and 54°6 C., and it was found that when the temperature gradually was advanced to 70° C., the bicarbonate was completely decomposed. Indeed, in the discussion following the reading of the author's paper, he expressed the belief that the salt could be completely decomposed by continuous heating at 54° C.—Pharm. Jour., March 18, 1899, 258–259.

Alkali Carbonates and Bicarbonates—Temperature of Decomposition.—In a second paper Mr. Corvie gives the results of experiments, carried out on the same line of investigation as the foregoing, with ammonium carbonate, lithium carbonate, and potassium bicarbonate. The only salt requiring treatment different from sodium bicarbonate is the ammonium carbonate. The difficulty is the ready sublimation of the salt, which is quite perceptible at 20° C.; and precaution had, therefore, to be taken to distinguish between sublimation and decomposition. This was effected by passing the vapor from the retort through a series of five glass bulbs immersed in ice-cold water. Carefully selecting his specimens as to purity and official quality, three determinations were made with each, and the temperature at which the carbonic anhydride escaped was noted, as shown in the following table:

Experiment.	Ammon. Carb. B. P.	Li_2CO_3.	$KHCO_3$.	$NaHCO_3$.
1	45° C.	40° C.	59° C.	54.5° C.
2.	44° C.	41° C.	60° C.	54° C.
3	45° C.	39° C.	60° C.	54° C.
Mean	44.7° C.	40° C.	59.6° C.	54.1° C.

It is thus shown that all the members of the group part with carbonic anhydride at temperatures between 40° C. and 60° C.—Pharm. Journ., April 22, 1899, 368.

Sodium Bicarbonate—Test for Limit of Carbonate.—Skubich recommends the following test for determining the pharmacopœial limit (Pharm. Germ. = 2 per cent.) of sodium carbonate in sodium bicarbonate: 1 Gm. of dry sodium bicarbonate is dissolved by careful agitation in 20 Cc. of normal potassium hydrate solution and 40 Cc. of solution of barium chloride (1 : 10) are mixed with the resultant solution, followed by 3 drops of phenolphthalein solution. After standing a short time, not more than 8.35 Cc. of normal hydrochloric acid should be required to establish exact neutrality. These figures correspond to a content of 2 per cent. of monocarbonate. The test becomes exceedingly delicate if $\frac{N}{10}$ hydrochloric acid is used in corresponding quantities instead of the normal.—Apoth. Ztg., Sept. 14, 1898, 644.

Sodium Bicarbonate—Test for Mono-Carbonate.—M. Kubli proposes the following test for the presence of excessive monocarbonate in sodium bicarbonate, which depends upon the observation that the aqueous solution of a quinine salt of certain concentration is not precipitated by sodium bicarbonate containing not more than 2 per cent. of monocarbonate. The quinine solution is prepared by dissolving 0.4 Gm. of the hydrochloride in 100 Cc. water, without filtering. The sodium bicarbonate is dissolved in the proportion of 6 Gm. to 100 Cc. of water, at a temperature not exceeding 10°. On mixing equal quantities — say 10 Cc.—of each of these solutions, a permanently turbid fluid is produced in presence of more than 2 per cent. of monocarbonate, otherwise the mixture remains clear. Turbidity which manifests itself upon the surface of the mixture only after 5 minutes' standing must be disregarded.—Apoth. Ztg., Nov. 19, 1898, 815.

Ammonium—Compounds with Lithium and Calcium—Henri Moissan has studied the compounds formed by the action of ammonia gas upon potassium, sodium, lithium, and calcium. The ammonium compounds formed decompose at ordinary pressure at the following temperatures: Lithium ammonium, at + 70°; calcium ammonium, at + 20°; potassium ammonium, at —2°; and sodium ammonium, at —20°.

Lithium- and Calcium-Ammonium take fire in contact with air at ordinary temperatures, but do not dissociate at ordinary pressure and temperature in an atmosphere of ammonia gas. They have the composition respectively of NH_3Li and $(NH_3)_4Ca$, and being stable compounds, lend themselves to addition and substitution reactions more readily than do the ammonium compounds of potassium and sodium.—Chem. News, Jan. 13, 1899, 22; from Compt. rend., cxxvii., No. 19.

Metallic Lithium — Electrolytic Process of Preparation. — Kahlenberg

has found that lithium may be obtained in white metallic form from solutions of lithium chloride in pyridine by electrolysis at room temperatures, as follows: A concentrated solution of lithium chloride in pyridine is placed in a beaker into which a carbon plate (anode) and a bright iron plate or foil (cathode) are dipped. Platinum or some other metal may, of course, also serve as cathode, though when used as anode a metal (even platinum) is apt to be attacked and some of its substance carried over to the cathode. No diaphragm is necessary. With a difference of potential of but 14 volts between the electrodes, a current of from 0.2 to 0.3 amperes per 100 sq. Cm. of cathode area will soon deposit a dense, well adhering silver white coating of metallic lithium. The deposit thus obtained possesses all the well known physical and chemical properties of the metal. By means of this method the metal can readily be obtained from the relatively cheap chloride in quantities sufficient for most scientific purposes. The method of preparation, as well as the properties of the metal, can thus easily be demonstrated to a class of students in a short time with simple means.—Pharm. Review, June 1899, 264; from Wisconsin Engineer, *3*, 274.

Lithium—Compounds with Ammonium.—H. Moissan finds that when pure lithium is exposed in a tube to the dry vapor of ammonia, it quickly assumes a reddish-brown color and rapidly liquefies with evolution of heat. The liquid continues to absorb ammonia. When absorption ceases, excess of ammonia is driven off by quickly heating the tube to 70° C. A red-brown solid,

Lithium Ammonium, results, which takes fire on contact with air. The same body is formed if lithium is immersed in liquefied ammonia, and the tube containing it allowed to revert to normal temperatures, when the deep blue liquid at first formed gradually thickens and becomes reddish-brown. The constitution of this body, as determined by synthetical and analytical methods, corresponds with the formula NH_3Li. In contact with water, it is decomposed with formation of lithium hydrate, ammonia and hydrogen. If it is dissolved in pure ammonia, it is slowly transformed at ordinary temperatures—rapidly at 63.80° C—into

Lithium Amide, NH_2Li. This forms brilliant transparent crystals, which are very slightly soluble in liquefied ammonia.—Pharm. Journ., Dec. 3, 1898, 583; from Compt. rend., cxxvii, 686.

Lithium Chloride—Compounds with Ammonia.—J. Bonnefoi has investigated the four possible combinations of lithium chloride and ammonia. $LiCl.NH_3$ is formed when LiCl absorbs quite pure and dry NH_3 at temperatures above 85° and atmospheric pressure; the compound formed being kept above 85°. $LiCl.2NH_3$ is formed under the same conditions between 60° and 85°. $LiCl.3NH_3$, between 20° and 60°; and $LiCl.4NH_3$, the saturated compound, below 13°. Measurements show that the heat

of combination diminishes in proportion as the new molecules are added; while, at the same time, the stability of the compound diminishes, and the dissociation tension becomes greater for the same temperature. The numbers for the heat formation, calculated by Clapeyron's formula, agree in all cases with the direct thermo-chemical measurements.—Chem. News, Dec. 9, 1898, 291; from Compt. rend., cxxvii, No. 8, Aug. 22, 1898.

Lithium Carbonate—Pharmacopœial Characters.—As a member of Research Committee E., Pharmacopœia Revision, Lyman F. Kebler has made comprehensive studies concerning the characters of lithium carbonate that should be required in the U. S. Pharm., with results which lead him to recommend the following characters of the official salt:

"A light, white powder, with occasional crystalline grains, odorless and having an alkaline taste; permanent in the air. Soluble in not less than 75 parts, and should not require more than 80 parts of water at 15° C., and in 140 parts of boiling water; much more soluble in water impregnated with carbon dioxide; insoluble in alcohol. Soluble in dilute nitric, sulphuric, hydrochloric, and acetic acids, with active effervescence. Fuses at a low red heat; loses carbon dioxide at a high temperature, and is partly converted into the oxide. It imparts a crimson color to a non-luminous flame. The aqueous solution has an alkaline reaction upon litmus paper. One gramme dissolved in 50 Cc. of dilute acetic acid, should at most leave only a trace of insoluble matter (limit of *mechanical impurities*). Separate portions of this solution should not be affected by: hydrogen sulphide, T. S. (absence of *arsenic*, *lead*, etc.); ammonium oxalate, T. S. (absence of calcium); or sodium cobaltic nitrite, T. S. (limit of *potassium*); or produce more than a faint opalescence with silver nitrate, T. S. (limit of *chloride*); barium chloride, T. S. (limit of *sulphate*); or more than a slight coloration with ammonium sulphide T. S. (limit of *iron*, *manganese*, etc.). If 0.5 Gm. of lithium carbonate be dissolved in 2 Cc. of hydrochloric acid and the clear solution evaporated to dryness, the dry residue should dissolve completely in 3 Cc. of absolute alcohol, and 3 Cc. of ether added to this solution should not render it turbid (limit of *other alkalies*). If 1 Gm. of the dry salt be mixed with 25 Cc. of water, to which have been added a few drops of methyl-orange solution, it should require for neutrality not less than 26.7 Cc. of normal sulphuric acid, corresponding to at least 98.61 per cent. of pure salt.—Amer. Journ. Pharm., Dec. 1898, 600–606.

CALCIUM.

Metallic Calcium—New Method of Crystallizing.—Henri Moissan, after reviewing the historical facts pertaining to the preparation and, particularly, the crystallization of metallic calcium, gives the details of a new method of crystallization that has been successfully employed by him. In this he takes advantage of the property this metal possesses—unknown

up till now—of dissolving in liquid sodium kept at a dull red heat. On cooling, the calcium crystallizes in the midst of the sodium, and by treating the metallic mass with absolute alcohol there remain brilliant white crystals of pure calcium of a hexagonal form. Calcium, while soluble at a dull red heat, is almost insoluble in liquid sodium at its point of solidification.—Chem. News, July 22, 1898, 37; from Compt. rend., cxxvi, No. 25.

Calcium—Properties of the Pure Metal.—H. Moissan records the following properties as characteristic of pure metallic calcium: It melts at 700° C. to a brilliant liquid. On cooling, it may be cut with a knife, but it is less malleable than potassium or sodium. The surface, when perfectly free from nitrogen, is brilliantly white, like silver. The density is 1.85. Its crystals are hexagonal tablets or secondary rhombohedra. It is not acted on by chlorine in the cold, but combines with it at about 400° C. with incandescence. It does not combine with liquid bromine, but burns in its vapor below a low red heat. In oxygen when heated to 300°, it burns with a dazzling flame, evolving sufficient heat to melt and volatilize part of the lime produced. It also combines directly when heated with sulphur, phosphorus, arsenic, antimony and bismuth. When heated with lamp-black, it forms calcium carbide below a red heat. The author has also prepared

Calcium Ammonium, in a manner similar to that followed for lithium ammonium (which see under lithium). As soon as calcium comes in contact with ammonia gas, each crystal of the metal assumes a fine yellowish-brown color, and increases in volume, with a notable rise of temperature. If the temperature be maintained at between 15° and 20° C., only a solid body, $(NH_3)_4Ca$, is formed, and no liquefaction takes place. This body takes fire and burns with a brilliant flame in contact with air. In liquefied ammonia it dissolves, forming a pasty mass, which is not soluble in a further quantity of the liquid. Calcium ammonium is of a deeper bronze color than the lithium compound. It gradually decomposes at ordinary temperatures, forming

Calcium Amide, $(NH_2)_2Ca$, and evolving hydrogen and ammonia. Calcium amide is crystalline.—Pharm. Jour., Dec. 3, 1898, 583; from Compt. rend., cxxvii., 585 and 690.

Calcium Hydride—Preparation and Properties.—Henri Moissan prepares calcium hydride by the direct union of pure crystallized calcium and pure dry hydrogen. The calcium is placed in a nickel boat in a glass tube traversed by the hydrogen in a rapid current. When the tube has been well swept, the end of it is sealed, and the hydrogen kept in at a pressure of 30 to 40 Cm. of water. The temperature of the boat containing the calcium is then slowly raised, and when it reaches a dull red heat it takes fire in the atmosphere of hydrogen. The gas is absorbed with great rapidity, and the metal is converted into a white substance, which is calcium

hydride. This, after fusion, has a crystalline fracture. Under the microscope it appears in thin transparent layers, some of which are again covered by very small crystals. It does not perceptibly dissociate up to a temperature of 600° in vacuo. Its density taken in oil of turpentine is 1.7. It is an energetic reducing agent, and is violently decomposed when in contact with water, strongly resembling in this respect the definitely crystallized calcium prepared in the electric furnace. In its composition it corresponds closely to the formula CaH_2.—Chem. News, Sept. 23, 1898, 158–159; from Compt. rend., cxxvii., No. 1.

Calcium Nitride—Preparation and Properties.—H. Moissan finds that when pure crystalline calcium is exposed to heat in an atmosphere of pure dry nitrogen, it gradually absorbs nitrogen, becomes yellow, and eventually is converted into nitride, N_2Ca_3. The best method of preparing the nitride is to place the calcium into a nickel boat, the latter into a tube of the same metal, and then passing a current of pure dry nitrogen through the tube. The nitride is thus obtained in the form of small, transparent, brownish-yellow crystals having a density of 2.63 at 17° C. It unites easily with chlorine, bromine, iodine, oxygen, sulphur and phosphorus, and is decomposed by carbon at a high temperature. With anhydrous alcohol it gives ammonia and calcium ethylate; it decomposes water with formation of ammonia.—Chem. News, Dec. 3, 1898, 327; from Compt. rend., cxxvii., No. 15, (Oct. 10, 1898).

Calcium Carbide—Color due to Impurities.—H. Moissan has recently succeeded in preparing perfectly pure calcium carbide, by reducing pure calcium hydride in a bed of pure amorphous carbon. So obtained it is quite white, and forms white scales which are seen to be transparent when viewed through a lens. The presence of the least trace of iron is sufficient to color these scales, and the brownish color of the commercial calcium carbide is due to traces of this metal.—Pharm. Journ., Jan. 7, 1899, 1; from Compt. rend., cxxvii., 917.

MAGNESIUM.

Magnesia—Absorption of Carbonic Anhydride.—In the course of an investigation as to the quality of commercial calcined magnesia by Dr. B. H. Paul and A. J. Cownley, it was considered expedient by them to extend the inquiry so as to ascertain the extent of the absorption of carbonic anhydride by calcined magnesia when exposed to air under ordinary atmospheric conditions. In the course of their experiments they examined magnesia which had been exposed under varying conditions, and found that the amount of carbonic acid absorbed is insignificant, and the process a very slow one. In the case of five samples obtained from as many different manufacturers, the amount of carbonic anhydride determined corresponded respectively to 1.8, 2.1, 3.3, 3.3 and 4.8 per cent. of magnesium carbonate, while the amount of carbonate contained in a sample that had

been kept in an ordinary shop-bottle in a pharmacy for ten years did not reach quite 10 per cent. The authors, as a result of their inquiry, conclude that there is no justification for the presence of more than 5 per cent. of carbonate in calcined magnesia. When this percentage is exceeded, it is probably due to intentional admixture or faulty preparation. Incidentally, the authors describe the method adopted for the determination of carbonic anhydride in the magnesia and its preparations, which they recommend as being expeditious, and a great improvement on the ordinary method of determining CO_2. By this method the CO_2 is measured over mercury in an ordinary nitrometer, the process being conducted as follows: 0.5 Gm. of the magnesia is rubbed down with 3 Cc. of water in a small glass dish of about 10 Cc. capacity, and the contents conveyed to the cup of the nitrometer and run into the measuring tube, two portions of 1 Cc. of water being used to wash out the dish and cup in this transfer. Five Cc. of concentrated hydrochloric acid are then added, the measuring tube slightly agitated, and the liberated gas is noted in the usual way, corrections being made for temperature, pressure on the dry gas, and solubility. The solubility of CO_2 in the 10 Cc. of acid and saline liquor was found, after careful experiments, when working under the conditions specified, to be 1 Cc. at 60° F., and 758 Mm. pressure.—Pharm. Journ. Oct. 8, 1898, 389–390.

ALUMINUM.

Aluminum—Resistance to Chemical Reagents.—The experiments of A. Ditte seem to show that the resistance of aluminum to the attack of acids and other chemical reagents is not as strong as is generally considered. When the metal is placed in dilute acids it dissolves rapidly at first, but a layer of gas is formed and adheres firmly on the surface, which resists further action. If this is removed by suitable means as fast as formed, the metal will dissolve completely.—Chem. News, Jan. 27, 1899, 47; from Compt. rend., cxxvii. (1898), No. 23.

In continuation of his experiments on the action of chemical reagents upon aluminum, the author has now endeavored to ascertain whether the reactions noted are the same in the presence or absence of air. His results show that the alteration of the aluminum is distinctly facilitated by using atmospheres of oxygen and carbonic acid. The experiments were made with a mixture of sea-salt and acetic acid.—Chem. News, Mar. 3, 1899, 105; from Compt. rend., cxxviii., No. 4 (Jan. 23, 1899).

Aluminum—Action of Nitric Acid under Different Conditions.—T. E. Stillman has found that thick sheets of aluminum are scarcely attacked at all by nitric acid at the ordinary temperature, and only slowly on raising the temperature. Thin layers, on the other hand, are attacked with more or less facility, according to the concentration of the acid and the temperature at which the operation is performed. The increased action,

however, to judge from the tabulated results, is quite erratic. Used in the proportion of 100 times the weight of the metal, an acid of sp. gr. 1.15 will dissolve 94.2 per cent. of the latter in 7 days at 20° C., while an acid of 1.35 will dissolve only 89.0 per cent. and one of 1.46 only 12.0 per cent. at the same time and temperature. At 100° C., acids of the strength given, and in the same order, will dissolve all the metal in 20 and 30 minutes and in 2 hours respectively.—Pharm. Journ., Aug. 6, 1898, 117; from Journ. de Pharm. et. Chim., (6), vii., 592.

Aluminum—Impurities.—Adolphe Minet finds that the impurities of aluminum prepared by the new electrolytic method consist principally of silicon and iron, with traces of carbon. The exact amounts were determined for aluminum prepared in 1890, 1895 and 1897, and were as follows in the order named: Silicon, 0.90, 0.25, 0.02 per cent.; iron, 0.40, 0.40, 0.12.—Chem. News, June 9, 1899, 276; from Compt. rend., cxxviii., No. 19 (May 8, 1899).

Aluminum—Method of Electro-Plating.—Lauseigne and Leblanc give a number of formulas for baths for electro-plating aluminum, which they say will give good results. Before plating, the article should be dipped in a bath of dilute soda or potash, or in diluted hydrochloric acid, 1 : 10, and then scrubbed in pure water. The baths are prepared as follows: *Gold:* Gold chloride, 40 Gm.; potassium cyanide, 40 Gm.; sodium phosphate, 40 Gm.; distilled water, 2 liters. *Silver:* Silver nitrate, 20 Gm.; potassium cyanide, 40 Gm.; sodium phosphate, 40 Gm.; distilled water, 1 liter. *Copper:* Copper chloride, 300 Gm.; potassium cyanide, 450 Gm.; sodium phosphate, 450 Gm.; distilled water, 5 liters. *Nickel:* Nickel chloride, 70 Gm.; sodium phosphate, 70 Gm.; distilled water, 1 liter. These baths should be warmed to between 60° and 70° C. during the whole operation. The anodes of the batteries should be of the same metal as is in solution in the bath.—Journ. de Pharm. (6), ix, 77.

Bolus Alba--Presence of Iron in a Sample used for Clarifying Honey.—Feodor Miehle calls attention to the possible introduction of iron into preparations through the medium of white bole, used for clarification, and to facilitate filtration. In the case of a sample of honey of roses, which was turbid and very dark, nearly black, this unsatisfactory condition was traced to honey clarified by means of bolus alba, which was on examination found to contain appreciable quantities of iron. The presence of iron as an impurity of bolus alba is not mentioned in the Germ. Pharm.—Apoth. Ztg.. Nov. 30, 1898, 839.

Kil—A Russian Mineral Soap.—Dr. Weliamowitsch calls attention to a peculiar clay found on the borders of the Black Sea, and known to the Tartars by the name of "kil." Analysis has shown it to be composed of silica, iron, alumina, lime and magnesia, the last two in the form of carbonates. He recommends it as a substitute for soap in dermatological

practice, and also as a basis for ointments, pastes, etc. It is easily sterilized by simple heating to redness, and furnishes a dusting powder which has proven useful in the treatment of eczema, etc.—Pharm. Centralh., Jan. 26, 1899, 62.

CERIUM.

Cerium Salts—A Substitute for Permanganate in Volumetric Analysis.—A. Job suggests that cerium salts, being a very stable and at the same time active oxidizing agent, should be employed in volumetric analysis in place of the unstable permanganate now used. They are, furthermore, available in many cases in which permanganate cannot be employed. The presence of the accompanying metals of the same group as cerium does not interfere with the result, so that a standard cerium solution may be prepared from monazite, or from any commercial cerium salt.—Pharm. Journ., Jan. 28, 1889; from Compt. rend., cxxviii., 102.

DIDYMIUM.

Didymium—Intimate Association with Neodymium in Yttria from Monazite Sands.—G. Urbain, referring to a recent announcement of Boudonard that he had separated from the yttria of the monazite sands a didymium earth but slightly soluble in potassium sulphate, and presenting all the characteristics of neodymium, confirms that author's observation by his own previous and recent experiments, in so far as he finds this didymium to be largely composed of neodymium. Though possessing all the characteristics of neodymium, it could not be entirely identified with it, and also contained a large proportion of foreign earths, though the didymium has been eliminated as completely as possible by fresh precipitations by potassium sulphate. This substance being, therefore, actually very rich in neodymium, Urbain agrees with Boudonard that the process adopted by the latter is likely to give better results than that adopted by Auer von Welsbach for the preparation of neodymium.—Chem. News, Aug. 12, 1898, 74; from Bull. Soc. Chim. (3), xx., No. 9.

Didymium Chloride—An Energetic Disinfectant and Preservative.—Drossbach recommends didymium chloride, which is obtained as a by-product in the manufacture of certain salts of the rarer earth-metals, and consequently cheap, as an energetic disinfectant and preservative. It is supplied in the form of a rose-red solution containing 25 to 30 per cent. of the salt, which is odorless and non-irritant. In form of solutions, 1 : 500 to 1 : 1000, it prevents putrefactive decomposition, and is in this respect superior to carbolic or boric acid, cupric or ferrous sulphate, zinc chloride, etc.

Didymium sulphate, a pale-rose-red powder, serves a similar good purpose for disinfecting closets, etc., the powder being applied in substance.—Pharm. Centralh., Sept. 29, 1898, 702.

MANGANESE.

Manganese Dioxide — Formation of Double Iodates.—Few compounds are known in which manganese dioxide reacts as a basic oxide, and these are only stable in presence of excess of acid. A. Berg has discovered that iodic acid gives an iodate of manganese dioxide having properties analogous to those of the other salts of the same nature. Hydrated manganese dioxide was prepared by the action of potassium permanganate on a manganous salt, and this partially dissolved on boiling with a solution of iodic acid, giving a brown solution. It was not possible to isolate the iodate from the excess of iodic acid, on account of its instability; but in presence of certain metallic iodates more stable double iodates were produced. These compounds are insoluble in water, and not much attacked by it. The potassium salt had the formula $(IO_3)_4Mn.2IO_3K$, and similar results were obtained with the barium and ammonium salts.—Chem. News, April 7, 1899, 168; from Compt. rend., cxxviii., No. 11 (March 13, 1899).

IRON.

Iron—Function in Plants.—Stoklasa finds that iron exists in plants in the form of an organic compound, which possesses similar properties and composition to the hæmatogen of animals, as described by Bunge, but that it is richer in iron than that body. The iron is originally chiefly stored up in the embryo or endosperm. During the germination it is drawn upon to form the nuclei of the cells of the young organs; after this the plant procures it from its environment, and if it be deprived of the metal, it dies. The presence of iron in the nutritive pabulum is as essential to the chlorophyll-free fungi as to the highly developed plants, and is, like phosphorus, an essential constituent of the cellular nucleus.—Pharm. Journ., Sept. 24, 1898, 345; from Compt. rend., cxxvii., 282.

Powdered Iron, Ph. Germ.—Correction of the Iodometric Method of Determination.—Geo. Breustredt, on the basis of an exhaustive series of experiments, undertaken to determine the cause for variations observed when the iodometric method of the Germ. Pharm. was applied to samples of powdered iron in which the metal had been previously determined by reliable gravimetric methods, recommends the use of a larger quantity of potassium iodide than is directed in the official process, and states that uniformly reliable results are obtained if the process is carried out as follows: 1.0 Gm. of powdered iron is dissolved in 50 Cc. of diluted sulphuric acid, the solution is oxidized by the addition of 0.25 Gm. of potassium permanganate in 25 Cc. of water until a faint rose color is produced. Upon the disappearance of the rose color after standing, the volume of the solution is brought to 100 Cc., it is well mixed, and filtered through a dry filter. To 25 Cc. of the filtrate contained in a glass-stoppered vial, having a capacity of about 100 Cc., 2.5 Gm. of potassium iodide are added. The

well-stoppered vial is allowed to stand for one hour in the dark at the ordinary temperature, and the quantity of liberated iodine is then ascertained by means of $\frac{1}{10}$ N. thiosulphate solution, using starch-paste as indicator. At least 17.5 Cc. of the thiosulphate solution should be required for this purpose. The process is applicable and equally reliable for determining the value of reduced iron, saccharated carbonate of iron, etc.—Apoth. Ztg., July 27, 1898, 520–521.

Ferrum Reductum—Examination of Commercial Samples in Accordance with the B. P., 1898.—E. Saville Peck describes in detail the results of an examination of fifteen samples of reduced iron obtained from different sources, his paper being provided with a number of tables for convenient comparison. He found that, with few exceptions, the more silvery grey the sample, the more free metallic iron it contained. No sample was found to dissolve completely when treated with hydrochloric acid, a variable residue of carbon and silica being left. The hydrogen liberated had in all cases a smell resembling a hydrocarbon, such as carburetted hydrogen or an olefine, and when passed through filter paper soaked in lead acetate solution, it caused in every sample a brownish or blackish coloration of the paper, due to lead sulphide, though the smell of hydrogen sulphide could not be always detected. The solution in hydrochloric acid also gave in each case a more or less light or dark blue colored precipitate with potassium ferro-cyanide, indicating the presence of ferric oxide in the sample under examination. Nine samples out of twelve were found to contain traces of arsenic in variable proportions—probably derived from impure zinc, and in the generation of the hydrogen used for its preparation. Five of the samples proved to give distinct reactions for the presence of free alkali, the probable source of which is doubtless insufficient washing of the precipitated hydroxide. The author also offers some suggestions with the view to securing concordant results when conducting the assay of samples of reduced iron, which must be consulted in the detailed description. In conclusion he suggests that in the preparation of ferrum reductum the following conditions be observed: The ferric hydroxide should be thoroughly washed and the hydrogen carefully purified. To the official requirements, more stringent tests should be added to insure the absence of sulphides, and of more than 1 per cent. of insoluble residue, and of alkaline carbonates; there should be a limit to the amount of arsenic present, and the assay process modified in accordance with the suggestions above referred to.—Proc. Brit. Phar. Conf., 1898, 399–406.

COBALT.

Cobalt—Estimation in Presence of Nickel and Iron.—When a solution of a salt of cobalt is added drop by drop to a solution of bicarbonate of potassium, a clear rose-colored liquid is produced. A small quantity of peroxide of hydrogen or bromine water added to this turns the color to

green. Many attempts have been made to separate and analyze the green compound. André Job obtains satisfactory results by employing ferrous solutions, which when added to the green cobalt solution change the green color to rose. A known quantity of cobalt is peroxidized, and to it is added a known quantity of ferrous pyrophosphate; the excess of the latter is estimated by iodine. The numbers found agree with the oxidation formula, $2CoO + O = Co_2O_3$. The chief difficulty is to insure the complete peroxidation of the cobalt; to do this a large excess of hydrogen peroxide is added to the alkaline cobalt salt and left for several days. From this reaction a rapid and easy method of estimating cobalt in the presence of nickel and iron may be deduced; for nickel is not oxidized under these conditions, and ferric salts are not reduced by ferrous pyrophosphate. Chem. News, Nov. 18, 1898, 254; from Compt. rend, July 11, 1898.

NICKEL.

Nickel—Extraction from Ores by Carbon Monoxide.—L. Mond recommends a process for the extraction of nickel from its ores which is based upon the fact that this metal, though having a melting point of over 1100° C., is yet able to combine with carbon monoxide at a temperature of a little over 50° C. to form a gaseous compound—nickel carbonyl. That gas in its turn, on heating to a temperature of 150° C., becomes completely dissociated, pure carbon monoxide being given off, and metallic nickel deposited on the sides of the vessel in which the gas is heated. In practice the nickel ores, most of which contain sulphur and arsenic, are first roasted to convert them as far as possible into oxides, and the resulting oxides are treated with reducing gases so as to reduce them to finely divided metallic nickel. The reduced nickel is then transferred to a suitable tower, which is maintained at a temperature not exceeding 100° C., and carbon monoxide passed over the material. The nickel carbonyl thus formed is then passed into a chamber or other vessel containing granules of commercial nickel or iron, and on heating to 180 C., the nickel carbonyl is immediately decomposed, and metallic nickel deposited on the granules of metal, whilst carbon monoxide is set free. The latter is returned to the volatilizer, where it attacks a fresh quantity of nickel, so that the process is continuous.—Pharm. Journ., Nov. 19, 1898, 525.

CADMIUM.

Cadmium — Precipitation by Hydrogen Sulphide. — Robert Meldrum states that the acidification with HCl of hot solutions of cadmium salts in precipitation by hydrogen sulphide, which is the common practice, is not advisable. Several cases of failure to discover cadmium when present in appreciable quantity have recently come under his notice, and he has no doubt that this is due to excess of HCl being present. He finds that

neutral solutions containing from 0.025 to 0.5 Gm. of cadmium sulphate or more per 10 Cc. when precipitated in the cold by H_2S, give a canary-yellow curdy precipitate, which settles in a few minutes, leaving a dense opaque yellow solution above. Heated to boiling, the precipitate changes to orange yellow, settling rapidly and leaving the liquid clear with a slight yellowish tinge. On cooling, the orange color of the precipitates pales slightly, but does not regain its former color. If the hot solution is agitated while cooling, the precipitate settles slowly, and the supernatant solution remains opaque. In solutions containing 0.02 to 0.005 Gm. of the cadmium salt per 10 Cc., the precipitate falls in a few minutes, leaving the solution slightly opalescent; with 0.0025 to 0.002 Gm. a strong yellow opalescent solution results, and a small precipitate forms on boiling; the same yellow solution, but no precipitate on boiling, forms in solutions containing 0.00175, after an hour's standing, and in weaker solutions correspondingly lighter yellow colored solutions are formed. But all of them are solutions only in appearance, for in all of them, even the weaker—containing 0.000125 Gm. per 10 Cc.—a deposit of yellow sulphide forms after standing 24 hours. This behavior is considered very characteristic, and distinguishes cadmium sulphide from all other precipitates formed under the same conditions.—Chem. News, April 14, 1899, 170.

COPPER.

Copper—Modification of the Cyanide Process of Assay.—Catford, who has had a daily experience for more than twenty years with the cyanide process for the volumetric estimation of copper, observes that, although easy and convenient, it is not strictly accurate, because the quantity of cyanide required to discharge the blue color of ammoniacal copper solution depends upon the amount of ammonia, free and combined, which varies according to the amount of free acid to be saturated, and so varying quantities of secondary products, such as urea, formate of ammonia, etc., are formed. Fleck attempted to minimize this, and also introduced a second indicator, potassium ferrocyanide, so that as the blue is discharged there remains the red of cupric ferrocyanide, which in turn is decomposed by more KCN. This suggested to the author to leave out altogether the disturbing element—the ammonia—as follows: If the cupric solution is acid, add caustic fixed alkali until a slight permanent precipitate of cupric hydrate is produced, add a drop or two of 1 per cent. solution of potassium ferrocyanide, and run in the potassium cyanide until the greenish cupric cyanide at first produced is redissolved, and the solution becomes pink from the minute quantity of cupric ferrocyanide remaining. It is best to stop at this point to be sure that too much KCN has not been added. On standing, the cupric ferrocyanide will deposit, leaving the solution colorless.—Pharm. Journ., Nov. 19, 1898, 540; from Proc. Liverpool Chem. Assoc., Nov. 10, 1898.

Copper—A New and Extremely Delicate Reagent.—A writer in "Compt. rend." (cxxviii., 363) calls attention to formaldoxime (trioximidomethylene), either in a free state or as hydrochloride, as a very sensitive reagent for copper. With a trace of a soluble copper salt, in the presence of an excess of potash, an intense violet color is produced, while with strong solutions of copper a deep green color is formed. The reaction is sufficiently delicate to detect 1 part of cupric sulphate in 1,000,000. The reagent is made by mixing a 20 per cent. formaldehyde solution with hydroxylamine hydrochloride, the formaldoxime being formed when these are used in molecular proportions. The solution thus obtained keeps indefinitely.—Pharm. Journ., April 15, 1899.

Copper Salts—Substitutes for Silver in Photography.—Schneeberger has made a series of experiments which prove certain copper salts to be so sensitive to light as to render them possible substitutes for silver in photography. Thus,

Cuprous Iodide (Cu_2I_2) when dampened with ammonia and exposed to sunlight was turned deep blue, while a portion not exposed to it remained a pale blue. When air was excluded, the exposed cuprous iodide blackened in proportion to the exposure, the unexposed part being white. Plates suitably prepared and exposed were developed with a black color by treatment with dilute sulphuric acid. An emulsion of

Cuprous Oxide (Cu_2O) was also made and exposed, with exclusion of air, in water acidulated with sulphuric acid, and this also blackened, and kept that color when washed and dried. In this case fixation was effected by means of dilute hydrochloric acid.—Pharm. Journ., June 24, 1899, 565; from Brit. Journ. Photog., 46, 375.

Copper Phosphide—Production from the Sulphate by Hydrogen Phosphide.—Previous investigators having obtained a black precipitate by the action of hydrogen phosphide on copper sulphate, E. Rubinovitch has thoroughly investigated the subject. He finds that when a measured quantity of copper sulphate is acted on by hydrogen phosphide, and the precipitate filtered, and washed with distilled water free from air—the operation throughout being conducted in a vacuum—the product is well-defined copper phosphide, free from metallic copper, and corresponds to the formula $P_2Cu_5.H_2O$. Copper phosphide dissolves in strong sulphuric acid with evolution of PH_3. It is readily attacked by nitric acid and by bromine, and it reduces potassium permanganate.—Chem. News, Dec. 2, 1898, 279; from Compt. rend., cxxvii., No. 5 (Aug. 1, 1898).

CHROMIUM.

Chromium—Detection in Presence of a Large Proportion of Iron.—A. Seyda proposes a method for the detection of chromium in large proportions of iron, which is based on a reaction described nearly fifty years ago,

by A. Reynoso. The solution containing the mixture of ferric and chromic salts is treated with an excess of alkaline hydrate, then with potassium permanganate until the color is persistent when warmed. After heating to about 100° for a quarter of an hour, the solution is cooled, the excess of permanganate destroyed by means of a few drops of alcohol, and filtered. The yellow colored filtrate contains the chromium as alkaline chromate.—Chem. News, April 28, 1899, 203.

Lead—Estimation in Tin Foil.—A. Seyda recommends the following method for the estimation of lead in tin foil: Ten Gm. of the foil are dissolved in hydrochloric acid at 25 per cent., and a solution of nitric acid also at 25 per cent. is added for the purpose of transforming the stannous chloride into stannic chloride, and to dissolve the antimony which remains unattacked by the hydrochloric acid. Drop by drop a solution of caustic soda at 25 per cent. is added until the precipitate formed becomes redissolved. By maintaining the temperature at a point near boiling there is generally nothing but a slight opalescence left. Then add a small quantity of precipitated sulphur and treat with a current of hydrogen sulphide until the liquid takes a decidedly yellow tint. It is then allowed to stand for twenty-four hours, when the black precipitate is filtered off, washed with a solution of sulphide of sodium until a small portion of this clear liquid, acidulated with hydrochloric acid, gives a decidedly white deposit of sulphur. This washing requires a considerable time, but it is indispensable if the complete removal of the tin is required. The filter containing the moist precipitate is gently heated with nitric acid at 25 per cent., the solution is filtered, and the exhaustion with nitric acid repeated until a small portion of the filtered liquid no longer gives a black precipitate with hydrogen sulphide. The nitric solution containing all the lead is evaporated down with 20 Cc. of sulphuric acid, the lead sulphate filtered off, and weighed in the usual manner.—Chem. News, Aug. 26, 1898, 101; from Zeit. f. Offent. Chem. iii., 364.

Lead Chloroiodide—Formation from Lead Iodide.—V. Thomas finds that by the action of boiling hydrochloric acid on lead iodide a definite chloroiodide—PbICl—is uniformly produced. The same compound results by the interaction of lead iodide and a chloride, or of lead chloride and an iodide. The existence of the chloroiodide as a well defined chemical compound is shown by the product of oxidation it is able to form when treated with nitrogen peroxide.—Chem. News, July 8, 1899, 23; from Compt. rend., cxxvi., No. 19.

Lead—Double Halogen Salts.—V. Thomas has already shown that the chloride and iodide are susceptible of uniting in equal molecular weights to form a well defined chloro-iodide. He now gives an account of his further studies upon the same subject. He finds that

Lead Chlorobromides are formed by the following methods: (1) Action of hydracids on the halogen salts of lead; (2) solution of lead chloride in

a solution of bromide, or vice versa; (3) action of chloride and bromide of an alkali on chloride and bromide of lead; (4) action of bromine on chloriodides. The last two methods give the best results. The compound formed is anhydrous and crystalline, and can be kept for some months without decomposition; it is soluble in water, but is liable to be decomposed if the solution is very dilute.

Lead Bromoiodides are produced under analogous conditions to those which produce chlorobromides.—Chem. News, June 16, 1899, 287; from Compt. rend., cxxviii., No. 20 (May 20, 1899).

Lead and Potassium Iodide—A Sensitive Reagent for Water in Chloroform and Ether.—According to J. C. Huxley Brooks, the double iodide of lead and potassium—$PbI_2 2KI$—is an exceedingly sensitive reagent for water, and is capable of detecting its presence in chloroform or ether long after anhydrous cupric sulphate fails to indicate its presence. The reaction depends upon the assumption by the colorless salt of a yellow color in the presence of water, which manifests itself quite distinctly in the cases mentioned. To prepare the double iodide, 1 Gm. lead nitrate, dissolved in 10 Cc. of water, is treated with a saturated solution of potassium iodide until the precipitate at first produced is completely redissolved. On standing a copious crystalline precipitate of the double salt is then deposited. The supernatant liquid is rapidly decanted, and the residual crystals are shaken with 10 Cc. of absolute alcohol, which dissolves the excess of potassium iodide, and leaves the double iodide in the form of white, silky glistening crystals. These are exceedingly hygroscopic, and must be preserved over calcium chloride.—Pharm. Centralh., July 14, 1898, 509.

White Lead—Adulteration with Calcium Carbonate.—Paul Hamberger calls attention to the not infrequent adulteration of white lead, both dry and in oil, with calcium carbonate. He has recently examined seven samples. Three samples of dry white lead contained respectively 21.90, 22.79 and 22.70 per cent. of calcium carbonate; the four samples of white lead in oil contained 3.96, 18.01, 17.38 and 17.35 per cent. respectively, the percentage being based on the total white lead and oil.—Apoth. Ztg., Nov. 5, 1898, 777.

TIN.

Tin—Estimation in its Salts.—A Froenkel and J. Fasal give in detail a description of a method which they have devised for the estimation of tin in its salts. Briefly, the method consists in precipitating the tin on aluminum, dissolving the two metals in hydrochloric acid, and titrating the stannous chloride thus formed by means of iodine or potassium bichromate after having first neutralized nearly the whole of the hydrochloric acid. The method is sufficiently accurate for commercial purposes.—Chem. News, Aug. 26, 1898, 97.

Tin Chloro-Iodide.—Preparation and Properties—In a previous communication C. Lenormand had mentioned the existence of a new chlorobromide, viz., a chlorobromide of iron. He now describes another new compound, a chloro-iodide of tin, obtained by the action of iodine on anhydrous protochloride of tin. If a mixture of iodine and anhydrous chloride of tin in excess is heated in an open tube over a gas flame, an energetic reaction takes place; the iodine disappears and one portion of the mass becomes liquid, dense yellow fumes escape, and the excess of protochloride remains as residue with the liquid. If the operation is conducted in a sealed tube, the reaction takes place at 100°, and, although somewhat longer time is required, it is completed at the end of a few hours, and there then remains only a bright red liquid, with the excess of protochloride of tin from which it may be decanted. The liquid is the new compound $SnCl_2I_2$. It is a bright red and very mobile liquid, giving off abundant yellowish fumes, but less fuming than stannic chloride, and has a density at 15° of 3.287. When poured into water, it is decomposed, a certain hydrate being formed, which the author proposes to investigate. When subjected to heat it distills over up to a certain point, when—at about 297°—the distillation stops. The residue in the retort is found to be stannic iodide, while the distillate is a mixture of the three elements, viz., tin, chlorine and iodine, but containing all the chlorine of the original chloro-iodide. A second, third, fourth and fifth consecutive distillation was made with the distillates obtained, the residue invariably being composed of stannic iodide, and the distillate containing proportionally less iodine, while the distillation invariably ceased when the temperature of 297° was reached. The author considers it probable that an intermediate dissociable and soluble chloro-iodide of tin exists, which would account for the iodine in the distillate.—Chem. News, Jan. 6, 1898, 5; from Journ. de Pharm. (6) viii., No. 6.

TUNGSTEN.

Crystallized Tungsten—Electrolytic Separation and Properties.—L. A. Hallopon, by prolonging the electrolysis of paratungstate of lithium, by means of platinum electrodes, has succeeded in obtaining crystals of tungsten, mixed with a certain quantity of platinum, in needles reaching up to 4 Mm. in length, which can be isolated in a state of purity by picking them one by one. Their analysis has given 99.64 per cent. of tungsten. They have a gray metallic lustre, like that of steel, are not magnetic, and when heated to redness in a current of hydrogen (oxygen ? Rep.), they burn, and are transformed into

Tungstic Acid. This tungstic acid is absolutely pure, and retains the the form of the crystals of tungsten. These facts are analogous to that which is observed when tungstic acid is prepared by calcination of a crystallized tungstate of ammonia; the acid obtained appeared also to be

crystallized.—Chem. News, June 16, 1899, 281 ; from Bull. Soc. Chim., (3), xxi, No. 6.

A New Carbide of Tungsten—Preparation and Properties.—The only carbide of tungsten heretofore known is that obtained several years ago by Moissan by heating tungsten with an excess of carbon in the electric furnace. It has the composition W_2C. P. Williams now describes a new carbide, WC, obtained by heating together an intimate mixture of 120 parts tungstic acid, 20 parts petroleum charcoal, and 150 parts iron, in a carbon crucible, at a reddish-white heat, obtained by means of a powerful forge, for an hour. After cooling, a well melted button of iron was obtained containing the new carbide together with the double carbide of iron and tungsten. The iron is separated by treatment with warm hydrochloric acid, and the two carbides from each other, taking advantage of the magnetic properties of the double carbide, by the aid of a magnet. The new carbide, which is still mixed with graphite, is finally completely purified by simple treatment which is fully explained. The carbide may also be prepared from the same mixture in the electric furnace, the crystals produced being larger than those obtained by the use of the forge. Carbide of tungsten, having the composition WC, forms an iron-gray powder, which under the microscope is seen to be composed of non-transparent cubical crystals. It is very hard, easily scratches quartz, has the density of 15.7 at 18°, and melts with great difficulty ; but when liquefied by heating for a quarter of an hour in crucible retort of carbon with a current of 950 ampéres and 45 volts, it is transformed into W_2C and graphite. When heated to a red heat in a current of pure dry hydrogen, it does not undergo any change. —Chem. News, July 22, 1898, 38–39 ; from Compt. rend., cxxvi., No. 24.

Tungsten Tetra-Iodide—A New Compound.—E. Defacqz has obtained a new compound of tungsten and iodine, the tetra-iodide, WI_4, by heating tungsten hexachloride with excess of hydriodic acid to 110° C. On removing the hydrochloric acid formed, and the excess of hydriodic acid, after reaction ceased, and heating the residue thus obtained *in vacuo* to between 50° and 60° C. until iodine ceases to be liberated, the tetra-iodide remains as a black crystalline body.—Pharm. Journ., Nov. 5, 1898, 481 ; from Compt. rend., cxxvii., 511.

Tungsten Pentabromide—Preparation from Hexachloride and New Properties.—Ed. Defacqz states that the action of dry gaseous hydrobromic acid on pure hexachloride of tungsten affords a new method of preparation of tungsten pentabromide. The action takes place at about 250°. The pentabromide thus obtained is well crystalline in needles. It is very hygroscopic and easily decomposes in the presence of water, giving the blue oxide. It is soluble in a great number of liquids—carbon tetrachloride, chloroform, bromoform, absolute alcohol, ether, terebene, and benzene —but the solvent must be completely anhydrous. That it has been ob-

tained in a good state of purity is proved by analysis.—Chem. News, June 16, 1899, 287; from Compt. rend., cxxviii., No. 20 (May 20, 1899).

Silicide of Tungsten—Properties.—Following up the observation of Moissan, that silicon and tungsten combine if heated together in the electric furnace, E. Vigouroux has investigated the properties of the compound formed. He obtained a whitish mass by heating silicon and tungstic oxide together. To obtain from this the silicide of tungsten, the mass is suspended in a dilute solution of HCl as the positive pole, the negative pole consisting of a rod of carbon connected with a battery of two or three cells. The combined action of the acid and current dissolves away the metal, the silicide remaining intact. The crystals of silicide fall to the bottom of the vessel as they are liberated. These are treated first with aqua regia and then with ammonia, to remove the last traces of tungsten, and pure Si_3W_2 is left, which is crystalline, in the form of metallic-looking plates. It is heavy, having a density of 10.9; it is attacked by chlorine, bromine, and iodine at temperatures of about 300–500°; it burns brilliantly in pure oxygen at about 500°. Hydrochloric and nitric acids have no action in the cold; also the action of aqua regia is inappreciable; but a mixture of nitric and hydrofluoric acids attacks it violently. Silicide of tungsten is analyzed in the following manner: The silicide, contained in a glass vessel, is decomposed by chlorine at a high temperature; chlorides of tungsten and silicon are formed. The silicon chloride, being more volatile, is separated, converted into silica, and weighed. The metallic chloride is treated with nitric acid, forming tungstic acid, which is calcined and weighed.—Chem. News, Dec. 9, 1898, 291; from Compt. rend., cxxvii., No. 10 (Sept. 5, 1898).

Silico-tungstic Acid—A New Alkaloidal Precipitant.—See *Alkaloids*, under "Organic Chemistry."

VANADIUM.

Vanadine—A New Stomachic Antiseptic.—Weber has introduced into practice a liquid combination of vanadium and sodium chlorate, which he has found useful in overcoming the gastric fermentation so frequently concomitant with tuberculosis. The remedy is given in doses of 6 to 30 drops per diem, and is stated to be free from toxity.—Nouv. Rem., xiv., 340.

ARSENIC.

Arsenic—Biological Method of Detection.—It has been long known that certain mould fungi are capable of forming compounds with arsenic which possess specifically a garlicky odor. Abel has now made cultures of *penicillium brevicaule*, in the presence of arsenic, and found that under these conditions the evolution of garlicky odorous gases was so intense as to manifest itself in the presence of quantities as little as 0.00001, and even 0.000001 As_2O_3. As to the materials that could be introduced with the

arsenic, the results were obtained equally well in the presence of soil, wood, skins, leather, paper, the organs of poisoned animals, the contents of the stomach, urine, human hair, etc. It thus seems evident that this biological method may prove useful for detecting arsenic, even in obscure cases, the more particularly since neither phosphorus nor antimony produces gaseous compounds under the conditions named that possess the peculiar garlicky odor of the arsenical gases formed.—Apoth. Ztg., May 20, 1899, 291 ; from Berl. Klin. Wochenschr., 1899, 440.

Arsenic—Introduction into Wool by Sheep-dip.—J. H. Pearse calls attention to the practicable impossibility of obtaining wool of home or foreign growth which does not contain arsenic in larger quantity than that allowed by the Swedish government, viz., less than 0.0009 per cent. The reason of this is the fact that sheep-growers are obliged at certain seasons to dip their sheep, and in most cases the dip contains arsenic. The arsenic clings so tenaciously to the wool fibres that it is difficult, if not impossible, to get rid of all traces of the poison. He observes that a single firm in England claims that it supplies sufficient arsenical dip each year for one-fourth the sheep in the world, and that probably half the woolen fabrics worn in England are made from wool that has been treated with their preparation.—Pharm. Journ., July 13, 1898, 49.

Arsenic, etc.—A New Reagent for the Arsenic-Tin Group of Metals.—Ducommun has observed that if a small quantity of formalin (40 per cent. formaldehyde) is added to ammonium sulphide solution, the yellow color of the solution disappears, and a copious white precipitate forms after a short time, which redissolves, however, on the addition of a little concentrated sulphuric acid. If the ammonium sulphide solution is diluted so that it appears only faintly yellow, neither formalin nor sulphuric acid occasions a precipitate ; the solution remains as colorless as water. In the presence of arsenous sulphide, however, in the ammonium sulphide after decoloration with formalin, the addition of sulphuric acid will cause the formation of a voluminous white precipitate, which is insoluble in excess of sulphuric acid. Under the same conditions antimonous sulphide occasions a light orange-red precipitate, stannous or stannic sulphide a white, gold or yellowish-white, and platinum a brown-red precipitate. All of these precipitates are insoluble in excess of acid, and they are apparently organic compounds of the respective metals, as is evidenced by the blacking of the substances during their incineration upon porcelain. Necessary conditions to secure these reactions are strong dilution, and operation with cold solutions. While the reactions with gold and platinum are not very sensitive, it is quite possible to detect two milligrams of arsenous acid.—Pharm. Ztg., Nov. 5, 1898, 791 ; from Schweiz. Woch. f. Ch. & Pharm., 1898, 39.

Calcium Arsenide — Preparation and Character. — P. Lebeau has obtained calcium arsenide, Ca_3As_2, by heating metallic calcium in the vapor of arsenium, and also by reducing calcium arsenate in the presence of carbon in

the electric furnace. Both forms have a microcrystalline structure, though differing somewhat from each other as obtained by the two methods. They are equally permanent in the air at ordinary temperatures. In contact with water the synthetic arsenide undergoes rapid decomposition, hydrogen and AsH_3 are evolved, and a brown precipitate, probably a secondary arsenide, is formed. The arsenide obtained by reduction, on the other hand, under similar conditions, slowly and regularly gives off AsH_3 without any admixtures, and affords an admirable means of obtaining that gas in a chemically pure condition.—Pharm. Journ., Feb. 4, 1899, 96 ; from Compt. rend., cxxviii., 95.

Arsenous Acid—Criticism of the U. S. P. Method for its Estimation in Solutions.—T. L. Pelouski observes that while in the estimation of arsenous compounds by means of volumetric iodine solution the presence of sodium carbonate is considered objectionable, the valuation method of the United States Pharmacopœia directs that "If 24.7 Cc. of solution of arsenous acid be boiled for a few minutes with 2 grams of sodium bicarbonate, the liquid cooled, diluted with water to 100 Cc. and mixed with a little starch test solution, it should require from 49.9 to 50 Cc. of decinormal iodine volumetric solution to produce the blue tint of iodide of starch," and thus seems to court its presence, since sodium bicarbonate is gradually changed to the normal carbonate when its solutions are boiled. Experiments made and recorded in the present paper show, however, that while the pharmacopœial valuation of arsenous compounds is at fault in theory, the results are quite satisfactory ; yet the boiling might well be omitted, since equal or better results are obtained without it and at the same time the process is simplified. Further, it does not seem consistent that in the valuation of arsenous acid, United States Pharmacopœia, we should be directed to dissolve it with sodium bicarbonate by the aid of a "gentle" heat, while in the solution of arsenous acid, where the arsenous acid is already in solution, it directs the solution to be boiled for a few minutes.—West. Drug., Feb., 1899, 55–56.

ANTIMONY.

Antimony—Estimation in Tinfoil.—A. Seyda recommends the following method for estimating antimony in tinfoil: Five grams of the tinfoil are thrown, a little at a time, into a mixture of 100 cubic centimeters of concentrated nitric acid and 25 cubic centimeters of water. The metastannic acid is treated with nitric acid at 25 per cent. in a porcelain crucible and the mixture evaporated to dryness. The residue is dried on the water-bath. It is essential that the temperature of desiccation should not exceed 100° C., for the anhydrides of the oxides of tin and antimony do not appear to combine with soda. The still warm powder is thrown a little at a time into 60 Gm. of caustic soda in a state of fusion. The melted mass is cooled to about 100°, broken up, and dissolved in 700

cubic centimeters of water. The cloudy liquid is cooled, and one-third of its volume of alcohol at 95 per cent. is added, and the whole left for twenty-four hours. The precipitate is filtered by decantation, and the last portions washed on to a filter by means of a mixture of 1 part of water to 2 parts of alcohol. Instead of washing the precipitate with dilute alcohol, an operation which always removes a small portion of the antimony, it is better to repeat the fusion with caustic soda a second time. The precipitate is dried at 100° and separated from the filter. The latter is cut up into strips and thrown into 10 Gm. of melted caustic soda containing a small quantity of sodium nitrate. When the paper is entirely consumed, add the precipitate and proceed as before. To make quite sure of the insolubility of the sodium antimonate, the liquid should contain about 10 per cent. of caustic soda and 25 per cent. of alcohol. The antimony is finally precipitated in the state of sulphide.—Chem. News, Aug. 26, 1898, 101; from Zeit. für Offent. Chem., iii., 364.

Antimony Sulphides—Titrimetric Method of Estimation.—J. Hanus has determined the reliability of a volumetric method for the determination of antimony in its sulphides, which is based upon the oxidation of the trisulphide by ferric sulphate and the subsequent titration of the ferrous sulphate formed with permanganate, the reaction occurring according to the following equation: $Sb_2S_3 + 5Fe_2(SO_4)_3 + 8H_2O = 2H_3SbO_4 + 10FeSO_4 + 5H_2SO_4 + S_2$. The sulphide is boiled for fifteen minutes in a beaker with an excess of ferric sulphate, allowed to cool, and after adding an excess of concentrated sulphuric acid, titrated with permanganate. 1 Mol. Sb_2S_3 corresponds to 10 atoms of Fe. The method is applicable also to a mixture of $Sb_2S_3 + S_2$, but it is necessary here that the quantity of concentrated sulphuric acid shall be sufficient to redissolve the precipitate produced.—Apoth. Ztg., Aug. 31, 1898, 613.

New Soluble Antimonic Acid—Conditions of Formation.—By precipitating the red liquid resulting from the action of nitric acid on antimony trichloride with water, J. B. Senderson obtains: 1. A new antimonic acid, with the formula $Sb_2O_5.nH_2O$, soluble in water. 2. A hydrate, $Sb_2O_5 6H_2O$, produced by the desiccation of the preceding acid freely exposed to the air. 3. The hydrate $Sb_2O_5.3H_2O$, resulting from the desiccation of this latter in the presence of sulphuric acid. 4. Finally, the hydrate $Sb_2O_5.3H_2O$ becomes $Sb_2O_5.2H_2O$, at about 200°; $Sb_2O_5.H_2O$, at about 300°; Sb_2O_5, at about 400°; and this latter gradually changes to Sb_2O_4 when we heat it for a long time to a dull red heat. The author has also prepared a number of antimonates of nickel, copper, mercury, lead, cadmium, manganese, etc. Many of them, when air-dried, have the formula $Sb_2O_6M.5H_2O$; others contain more water, and resemble the hydrate $Sb_2O_5.nH_2O$, in which n is greater than 6, and of which the probable existence in solutions of antimonic hydrate has been shown. All these antimonates, after desiccation in the presence of sulphuric acid, have the

general formula $Sb_2O_6M.2H_2O$, corresponding with the antimonic hydrates dried in the same manner, the formula of which is $Sb_2O_5.3H_2O$.—Chem. News., May 12, 1899, 227; from Bull. Soc. Chim. (3), xxi.–xxii., No. 2.

BISMUTH.

Bismuth — Estimation by the Intervention of Formaldehyde.—L. Vanino and E. Treubert find that when a solution of a bismuth salt is heated, while stirring, with a mixture of formaldehyde and soda, the bismuth is completely precipitated in the metallic state. This reaction can be utilized for the separation of bismuth from certain other metals, such as aluminum, zinc, etc. In carrying out the reaction, a slightly acid solution of the bismuth salt is mixed with formaldehyde, and a large excess of a 10 per cent. solution of sodium hydrate. The mixture is heated in the water-bath and continuously stirred, until the metallic bismuth is entirely deposited and the supernatant liquid becomes perfectly clean. A further excess of formaldehyde and soda is then added, and the whole heated over a Bunsen for several minutes. The precipitate is washed by decantation with boiling water, then kneeded with a stirring rod to bring it into a compact mass, collected on a tared filter or in a Gooch crucible, washed with alcohol, and dried at 105° C.—Chem. News, April 28, 1899, 203; from Berichte (9), xxxi., 1303.

Colloidal Bismuth—Preparation, Etc.—Dr. L. Vanino observes that if 2 Gm. bismuth tartrate is dissolved in water by the aid of tartaric acid and potassium hydrate solution, diluted with water to 600 Gm., and mixed with a solution of 1.5 Gm. of stannic chloride in potassium hydrate solution, a clear brown fluid is obtained, which, when subjected to an electric current, deposits bismuth at the positive-pole. This can be easily washed, and consists largely of soluble colloidal bismuth, but soon changes to ordinary metallic bismuth. The author questions the utility of colloidal bismuth, however, since the soluble bismuth compounds are regarded as toxic in their action.—Phar. Centralh., May 4, 1899, 276.

Bismuth Iodides—Quantitative Determination of Iodine.—In the course of the examination of bismuth iodides, among them a commercial sample of a bismuth oxyiodide which in contradiction to the description of E. Schmidt was characterized by a light brick-red instead of a red-brown color, O. Spindler determined a method for the determination of iodine which he has found equally efficient for the examination of these several compounds and products. The method, the details of which are given by the author, is based upon the observation that ferric chloride liberates the iodine from these compounds completely; the iodine is then shaken out from the mixture with chloroform, and the solution so obtained is titrated, after the addition of solution of potassium iodide, in the usual manner with thiosulphate. Concerning the sample of

Commercial Bismuth Oxyiodide, the author observes that it yielded in

two experiments 21.98 per cent. and 21.95 per cent. of iodine, corresponding to an average content of 63.13 per cent. BiOI. A similar compound was obtained by treating a solution of bismuth nitrate in diluted nitric acid with potassium iodide until the precipitate of BiI_3 at first found is redissolved. The solution of bismuth-potassium iodide is then treated with solution of sodium carbonate until effervescence ceases, and the brick-red precipitate is washed and dried. It yielded in two examinations 26.53 per cent. and 26.57 per cent. of iodine.

Bismuth Oxyiodide, BiIO, contains theoretically 36.18 per cent. of iodine. Prepared by the method of E. Schmidt, it yielded 35.2 per cent. of iodine, corresponding to 97.33 per cent. BiIO.

Bismuth Iodide, BiI_3, contains theoretically 64.68 per cent. of iodine. A sample prepared by the author indicated 62.63 per cent. of iodine, equivalent to 97.1 per cent. BiI_3.

These results point out that the commercial brick-red bismuth oxyiodide is a body which has nothing in common with the chemical compound BiIO described by E. Schmidt, and further experiments have convinced the author that according to the conditions under which the commercial compound is prepared it may vary considerably in its composition, though having the same general appearance.—Apoth. Ztg., Aug. 17, 1898, 576.

Bismuth Oxyiodide—Preparation.—Sobet recommends the following method for preparing bismuth oxyiodide, for which he claims the advantage over others that the product yielded contains a definite amount of oxide and has a characteristic color: Dissolve 306 parts of bismuth subnitrate in 900 parts of pure nitric acid, dilute the solution with warm water until it begins to show turbidity, and pour it into a warm solution of 165.6 parts of potassium iodide in 2500 parts of water. The brown precipitate is washed, whereby it assumes a lighter color, and is then dried.—Pharm. Ztg., Sept. 17, 1898, 668; from Ann. de Pharm., 1898, 244.

Bismuth Subnitrate—Fallacy of the Silver Nitrate Test for Chloride.—The opalescence produced in solutions of bismuth subnitrate in nitric acid, on addition of silver nitrate solution, is commonly attributed to the presence of traces of chloride or hydrochloric acid. C. Glücksmann, however, has found that this opalescence will occur in solutions from which chlorides or hydrochloric acid are carefully excluded, and that the opalescence produced by the silver solution must be due to other causes. He therefore recommends for the detection of chloride in place of silver nitrate a solution of mercurous nitrate. He dissolves 0.5 Gm. of the subnitrate in 5 Cc. of diluted nitric acid in the cold, adds 10 Cc. of distilled water to the solution, and to 5 Cc. of the clear mixture adds from 2 to 3 drops of an acid solution of mercurous nitrate. In the presence of chloride opalescence or precipitation results, according to the extent of its presence; in its absence the liquid remains clear.—Ztschr. Oest. Apoth. Ver., 1898, 897.

Bismuth Subcarbonate—Arsenic as an Impurity.—P. Janzen calls attention to a sample of subcarbonate of bismuth received by him recently from an English manufacturing firm of repute, which contained appreciable quantities of arsenic. The same firm having previously on different occasions supplied a perfectly pure and satisfactory preparation, he corresponded with them, and was naturally astonished to learn that the presence of small percentages of arsenic in "subcarbonates" of bismuth was not considered of much importance, since the subcarbonate was "chiefly employed as a face powder." The author pertinently observes that it is not good policy to rely upon the representation of manufacturers —but rather to rely upon the personal examination and identification of quality. In this case the product of a reputable manufacturer was labeled "Bismuth Carbonic puriss. Ph. Brit.", and yet contained appreciable quantities of arsenic.—Apoth. Ztg., Febr. 11, 1899, 79.

MERCURY.

Colloidal Mercury—Preparation.—Dr. A. Lottermoser states that colloidal mercury cannot be obtained by either of the methods by which colloidal silver and colloidal gold are respectively produced, but that it may be obtained as follows: Very dilute solutions of mercurous nitrate and of stannous nitrate, containing only sufficient free acid to prevent the precipitation of basic salts, are mixed. A deep brown liquid is formed, which upon addition of a concentrated solution of ammonium citrate, becomes black, due to the formation of a black precipitate. The mixture is then neutralized with ammonia under constant stirring and avoidance of strong heat, and the precipitate is allowed to settle. The supernatant liquid is decanted, the precipitate transferred to porous tile, and finally dried in a vacuum exsiccator over sulphuric acid. The colloidal mercury is in this way obtained in silver-glistening pieces, which dissolve in water with a deep-brown color.—Apoth. Ztg., July 30, 1898, 531; from Jour. f. Prakt. Chem., 1898, 484.

Colloidal Mercury—Properties and Uses.—Dr. P. Süss describes some colloidal mercury procured by him as consisting of small dull-black pieces, exhibiting metallic lustre only here and there, and soluble in water with formation of a slightly turbid black-brown solution, which assumed a silver-grey color on heating. Soda solution and some of the acids produced the same change in color. Under the microscope the aqueous solution exhibited in a field of 370 diameters small yellowish-brown granules, which were partly united into larger aggregations. Upon paper the colloidal mercury could be triturated to form a black powder; but when triturated in a mortar, dry globules of mercury readily separated. When triturated with water the colloidal metal remains intact, and may be combined with a cold mixture of tallow and fats so as to produce an

Ointment of Colloidal Mercury, in the proportions of preparing the

grey mercurial ointment. The resulting ointment has a grey-black color, and when treated with petroleum ether leaves the colloidal mercury in the form of a black powder. When the carefully melted ointment is treated with water, the latter dissolves the colloidal mercury.—Apoth. Ztg., July 30, 1898, 532; from Pharm. Centralh., 1898, 553.

Colloidal Mercury—Characters.—Colloidal mercury, soluble in water, has recently been added to the long list of trade named remedial agents under the name of

Hyrgol. It is of a dark, nearly black color, soluble in cold water with considerable ease, but insoluble in alcohol and in ether. The aqueous solution is neutral and free from irritant action, dark in color, transparent by transmitted light, but strongly fluorescent and consequently opaque by reflected light. From aqueous solution the colloidal mercury is precipitated by acids, bases and salts of the heavy metals and alkaline earths. The salts of the alkalies and ammonium of acids which form soluble mercury-salts precipitate the colloidal mercury in the form of a fine white precipitate, which is redissolved with a brown color on addition of more water. The addition of albumen, however, prevents or retards this precipitation. In the form of a thin salve,

Unguentum hyrgoli, it has been used by Dr. Werler in place of ordinary mercurial ointment, over which it possesses the advantage of being more penetrant and that it does not produce irritation or mercurial eczema. It may be made of 10 per cent. strength by triturating 50 Gm. of hyrgol with 25 Gm. of distilled water, and incorporating the smooth paste formed with 425 Gm. of a suitable base—mollin, vaselin and lanolin, or simple ointment of lard, etc.—Pharm. Ztg., Nov. 5, 1898, 794.

Amalgams of the Alkaline Earths and Earth-Metals—Preparation and Use in Medicine.—Arvid Blomquist has discovered a practical method for preparing the amalgams of the alkaline earths and earth-metals, which enable their ready exhibition in permanent powdery form, and of any desired percentage of mercurial content—within certain limits. These amalgams are particularly useful for producing mercuric vapor, for instance in the inhalation treatment by the method of Welander, and the author has introduced a mixture of the amalgams of aluminum and magnesium, reduced with chalk to a content of 40 per cent. of mercury, which he names

Mercuriol.—It constitutes a gray, tolerably light powder, in which the mercury is in an extremely fine state of division—not that of the ordinary mercury trituration, in the form of microscopic globules, but in a practically amorphous form. When exposed to the air, heat or moisture, the aluminum and magnesium are oxidized, whilst the mercury is liberated as metal, its oxidation being prevented by the reducing action of magnesium and the formation of hydrogen in *status nascendi*. The formation of the

Amalgams of Aluminum and Magnesium are prepared by the direct union of the respective metals with mercury by the intervention of alkali hydrates. The combination is effected quietly and expeditiously, and not, as is the case with magnesium under the ordinary method of formation, with production of flame and explosions. The two amalgams together part with the mercury more readily than either of them by itself, hence their combined use in the preparation before described. The amalgams of *zinc*, *tin*, *cadmium*. and *lithium*, may be prepared in the same way, but are not suited for the medicinal use for which "Mercuriol" is proposed.—Apoth. Ztg., May 6, 1899, 250; from Arch. f. Dermatol. u. Syphil., 1899, xlviii., No. 1, 32.

Calcium Amalgam—Difficulty of Preparation and Properties.—T. Fersé finds that the amalgam of calcium is very difficult to prepare and almost impossible to keep, owing to its rapid oxidation. He has prepared small quantities of it by the electrolysis of the chloride, using a mercurial electrode or a porous diaphragm, separating the two electrodes, to prevent the action of the chlorine on the amalgam produced. To avoid rise of temperature in the vessel, cold water is kept circulating round it. The solid amalgam produced by this method is porous and whitish-green in color. It oxidizes rapidly in the air and decomposes water. It appears to correspond to the formula Ca_3Hg_4. Heated in a current of hydrogen to a high temperature, it loses more mercury. When heated in a current of nitrogen the nitride is produced.—Chem. News, Jan. 6, 1899, 11; from Compt. rend., cxxvii., No. 17 (Oct. 24, 1898).

Mercuric Chloride — Sub-cutaneous Administration. — Dr. Lagrange recommends the hypodermic use of oily solutions of mercuric chloride containing guaiacol in cases in which the internal or topical use of the mercuric chloride is inadmissible. He injects 2 Gm. of a solution (= 0.01 Gm. mercuric chloride) having the following composition: sterilized olive oil, 100 Cc.; mercuric chloride, 0.5 Gm.; synthetic guaiacol, recrystallized, 3.0 Gm. The particulars of the method of preparation of this solution are given by E. Bazin (see *Liquores* under "Pharmacy"). The administration by this method is painless, and the effect of the mercurial chloride remarkably prompt, and not complicated by untoward after-effects.—Apoth. Ztg., May 31, 1899, 323; from Petit. Monit. de la Pharm., 1899, 3207.

RUTHENIUM.

Ruthenium Tetroxide—An Explosion During its Preparation.—Jas. Lewis Howe calls attention to an explosion of ruthenium tetroxide during its distillation in the well-known manner from a melt obtained by fusing crude ruthenium with caustic potash and saltpetre; the RuO_4 being liberated by passing a rapid current of chlorine through the solution of the melt and collecting it in a receiving flask containing dilute alcoholic pot-

ash, in which the ruthenium is precipitated as a hydroxide. The explosion was occasioned by a cessation of the flow of chlorine from the delivery tube of the generator, and the consequent return of the alcoholic potash into the distilling flask, and was so violent as to shatter the flask completely, a splinter of glass being projected through the thick walls of a bottle without otherwise fracturing it. RuO_4 is rapidly reduced in contact with organic bodies, and explodes at once in contact with wood, rubber and the like—and so in this case with the alcohol of the potash solution.—Chem. News, Dec. 2, 1898, 269.

SILVER.

Silver—Reduction of Residues by Means of Formaldehyde.—It is well known that solutions of silver salts are rapidly reduced by alkaline formaldehyde solutions. Dr. Vanino draws attention to the fact that silver bromide, chloride and sulphocyanate are reduced with equal facility, and that this fact may be utilized conveniently for the reduction of silver residues by the simple addition of concentrated soda solution and 40 per cent. formaldehyde solution. To 50 Gm. of silver chloride or bromide, a solution of 30 Gm. of caustic soda and 15 Gm. of 40 per cent. formaldehyde solution are added; reduction begins at once, and in a few minutes all the silver is deposited in the metallic state. In the case of silver iodide the mixture must be boiled.—Pharm. Centralh., 1899, 53.

Silver Sulphide—Action of Hydrogen.—H. Pelabon has investigated the action between hydrogen and silver sulphide, and, inversely, between silver and hydrogen sulphide, in sealed tubes at a fixed temperature, the tube being quickly cooled after a definite time and the gases analyzed. He finds: (1) that for temperatures above 350° C. the limiting values for the proportion of hydrogen sulphide in the mixture are identical, whether the tube originally contained H_2S and silver or Ag_2S and hydrogen; and (2) that equilibrium is obtained in a time increasing as the temperature is lowered. The silver is deposited in the form of threads when the temperature is below 580°; at higher temperatures the particles of silver sulphide are seen at the end of the experiment to be covered with an almost uniform layer of metallic silver.—Chem. News, Nov. 11, 1898, 242; from Compt. rend., cxxvi., No. 26.

Silver Orthophosphate — Preparation and Medicinal Uses. — Spretzka finds that the acid silver orthophosphate has a marked germicidal action on gonococcus even in very dilute solution. He has used it successfully in cases of gonorrhœa in the form of injection containing 0.025 to 0.05 per cent. of the salt, increased gradually to 0.25 or even 0.5 per cent. The salt is prepared as follows: Silver phosphate is dissolved in an equivalent quantity of orthophosphoric acid previously evaporated on a water-bath to a syrupy consistence. A vitreous mass of the acid salt is thus obtained on cooling; it is therefore dissolved while in the melted state by adding

it very gradually to water previously rendered slightly acid with phosphoric acid, and permanent solutions are thus obtained, containing several per cent. of the salt, which may be diluted to the desired strength as needed. —Rév. Med. Pharm., *5*, 292 ; from. Prac. Med. Woch.

GOLD.

Gold and Silver—Melting Points.—Dr. Berthelot, by the aid of a previously described inferential method, has determined the melting points of silver and of gold. He found the average value for the melting point of silver to be 962° and for that of gold to be 1064°.—Apoth. Ztg., July 13, 1898, 490 ; from Compt. rend., cxxvi, 473.

Colloidal Gold—Soluble Metallic Form.—Zsigmondy describes a solution of metallic gold obtained as follows: A very dilute solution of gold chloride was rendered faintly alkaline, and then treated with formaldehyde. On subjecting the solution to dialysis, the colloidal gold remains on the dialyzer in a metallic state, but in solution, most of the saline contaminants being removed by passing through the membrane. The solution of colloidal gold so obtained has a red color. Upon the addition of sodium chloride or of diluted acids, the red color is instantly changed to blue ; the particles of the metal have become larger, and on the further addition of salt it is precipitated in form of powder. If, however, the solution of colloidal gold is mixed with a solution of colloidal stannic acid, the colloidal gold particles do not unite to form larger aggregations on the addition of salt or of acid, but retain their red color and are precipitated in intimate admixture with stannic oxide hydrate. The precipitate so formed is identical with the

Purple of Cassius, the chemical nature of which seems thus to have been established beyond a doubt.—Apoth. Ztg., July 13, 1898, 488 ; from Ztschr. f. Elektrochem, 1898, 546.

Gold Chloride.—A highly sensitive reagent for *tannin*, which see under "Organic Chemistry."

Auro-Sodic Chloride—Quantitative Determination of Gold.—L. Vanino recommends the determination of gold in chloride of gold and sodium by means of formaldehyde in alkaline solution. Commercial formaldehyde solution is added to the gold solution, followed by a few drops of soda solution, and the mixture is heated a few minutes on the water-bath to expedite the reaction. The reduced gold is collected and washed on a filter and dried at 180°, or it is, after washing, converted into a regulus by carfully melting in a platinum crucible. The presence of alkaline chlorides, which interfere with the reduction by means of oxalic acid, do not interfere if formaldehyde is used for this purpose. In case the gold solutions are very dilute, minutely divided gold may pass through the filter. In this event it becomes necessary to condense the precipitate by

the addition of diluted hydrochloric acid and frequent shaking. The reduction appears to take place according to the equation: $Au_2O_3 + 3HCOH = Au_2 + 3HCOOH$.—Pharm. Centralh., 1899, 275.

RARE METALS.

Rare Metals—Satisfactory Commercial Quality and Purity.—Mylius and Nitz have examined various rare metals of commerce as to quality and purity. They find that *platinum* is now supplied in a condition of absolute purity, having the sp. gr. 21.4. *Palladium* and *iridium* are also supplied nearly absolutely pure. The latter has a sp. gr. of 22.4 and contains at least 99.7 per cent. of the pure metal, the impurities consisting of 0 15 per cent. platinum and a trace of ruthenium. The most impure of the rare metals appears to be *rhodium*, sp. gr. 12.6, which contains 98.4 per cent. of the pure metals, and as impurities 1.5 per cent. iridium, 0.1 per cent. ruthenium, and a trace of platinum.—Apoth. Ztg., Feb. 8, 1899, 73 : from Berichte, 1898, *31*, 3187.

Palladium—Convenient Use as a Reducing Agent of Alkyl Iodides and Bromides.—Dr. N. Zelinsky describes a convenient method of employing palladium as a reducing agent. A zinc-palladium couple having been prepared from zinc and palladium chloride, it is placed into alcohol, and acid added until evolution of hydrogen gas begins. The palladium black being now saturated with hydrogen, it produces reduction of the alkyl iodide or bromide. The reduction proceeds energetically, and it is only necessary to continue the addition of acid and of alkyl compound alternately. It is claimed that from 70 to 75 per cent. of the theoretical quantity of hexamethylene and of ethyl- or methyl-hexamethylene are produced when the corresponding iodides or bromides are thus treated.—Pharm. Journ., Feb. 18, 1899, 139 ; from Berichte.

ORGANIC CHEMISTRY.

General Subjects.

Organic Iodine Compounds.—Review of those that have come into Modern Use.—A. Roderfeld observes that among the new remedial agents introduced during the last decade, the organic iodine compounds unqualifiedly take first rank in point of variety and number. It is interesting, therefore, to pass those that are known and used up to date in brief review. As the oldest of these compounds

Iodoform still holds its own, notwithstanding the numerous substitutes that have been offered for it from time to time. Among these substitutes,

Sozoiodol, in the form of different salts, potassium, sodium, mercury, zinc, etc., with sozoiodolic acid (diiodo-p-phenolsulphuric acid, $C_6H_2I_2O.SO_3H+H_2O$) is perhaps the one that was first received with favor. Next came into favor

Iodol—tetraiodopyrrol, C_4I_4NH, which, being insoluble in water, cannot be used with the same advantage as the before mentioned, but has found favor on account of its odorlessness and because it is so much lighter than iodoform.

Aristol, also known as *thymotol* and *annidalin*, is closely related to iodol, being diiododithymol, $C_{20}H_{24}O_2I_2$, soluble in ether. Another is

Europhen = isobutylorthocresoliodide, $C_4H_9(CH_3)C_6H_3C_6H_2OI.CH_3.C_4H_9$—which is soluble in alcohol, ether, chloroform, and in fixed oils. Then comes

Losophan—triiodometacresol, $C_6HI_3.OH.CH_3$—a white crystalline compound soluble in ether, chloroform, and fixed oils, and

Nosophen, also called *iodophen* = tetraiodophenolthalein, $(C_6H_2I_2OH)_2.C.C_6H_4CO.O$, a yellow powder, insoluble in water, but soluble in ether and chloroform.

Airol, also called *airoform*, is bismuth oxyiodogallate, $C_6H_2(OH)_4COOBiI$, used as a dusting powder, while

Bismuth oxyiodide, BiOI, a brown-red powder, is used both externally and internally.

Iodolin = chinolinchlormethylchloriodide ($C_9H_7NCH_3Cl.ClI$), is seldom used. It occurs in light yellow scaly crystals or powder, soluble in alcohol, very sparingly in water.

Iodophenin = triiododiphenacetin ($C_{20}H_{20}I_3N_2O_4$), forms black-brown crystals, soluble in water, and little used.

Imidiod, obtained from paraethoxyphenylsuccinimide, iodine and potassium iodide in acetic acid, and

Picrol = Diiodoresorcinmonosulphonic acid, also have found sparing use.

Diiodoform=ethylene periodide or ethylene tetraiodide (C_2I_4), occurring in yellow needles, and

Sanoform=Diiodosalycilmethylether ($C_6H_2.COOCH_3.OHI_2$), occurring in white needles, are both better known as iodoform substitutes than the two preceding compounds, as is also

Diiodo-salicylphenylester, a compound of iodine and salol, occurring in silky glistening needles.

Thiophenum biiodatum, an iodine compound containing sulphur ($C_4H_2I_2S$), occurs as a cyrstalline powder, soluble in ether, alcohol and chloroform.

Iodum Tribromatum (IBr_3) is a dark-brown liquid, soluble in water, while

Iodum Trichloratum (ICl_3) is a yellow, deliquescent powder, soluble in both water and alcohol.

Diiodoacetylene, C_2I_2, occurs in fine colorless needles, readily soluble, but having a disagreeable odor.

Iodoanisol (ortho-iodoanisol=$C_6H_4.OCH_3.I$) forms a reddish yellow crystalline mass, which is insoluble in water, but soluble in alcohol, ether, and chloroform.

Iodacrol (carvacrol iodide), obtained by the interaction of carvol and potassium iodide, is an odorless compound, soluble in ether, chloroform, and the fixed and volatile oils.

Amylum Iodatum and Amyloiodoform, the latter a compound of starch, iodine and formaldehyde, have in recent years found some use in medicine, while

Mydrol = Iodomethylphenylpyrazolon, a white, odorless, bitter powder, readily soluble in water and alcohol, and possessing mydriatic properties, is little used.

Traumatol, also called Iodocrésine, a compound formed by the action of iodine on cresylic acid, is also used as an iodoform substitute. It constitutes a very fine and voluminous, amorphous, violet-red powder, insoluble in water, nearly so in alcohol, but easily in chloroform.

Iodoformin and Iodoformol are both odorless iodoform compounds, the iodoformin being hexamethylenetetraminiodoform, and insoluble in water, alcohol or ether.

Iodoform-Iodethyl-Diethylsulphidmethane, and

Iodoform-Triethylsulphonic iodide, are two iodoform compounds containing sulphur. The last named resembles iodoform both in color and appearance very closely. Two new iodine compounds are

Iodogallicin = Bismuth oxyiodidemethylgallol, a light amorphous, insoluble dark grey powder, and

Iodothymoform (obtained by the action of iodine on thymoform—which see under *Thymol*.—Rep.). It is a yellow, nearly odorless powder, insoluble in water, but soluble in alcohol and ether. Another bismuth-iodine compound is

Bismuth oxyiodide pyrogallate, a fine, amorphous, yellow-red powder, insoluble in the ordinary solvents, but permanent in air and light. The most recent substitutes for iodoform are

Iodoformogen, a nearly odorless compound of iodoform and albumen, of a yellowish color, and insoluble in water, and

Eka-Iodoform, a compound of iodoform and paraform, constituting an absolutely sterilized and antiseptic substance. The author, in conclusion, enumerates and briefly describes the organic iodine compounds of more or less indefinite composition, such as:

Thyroidin, iodothyrodin, iodo-albumin, (= *alpha-eigon*), *iodo-peptonate* (= *beta-eigon*), *iodosin, iodipin, iodocasein, etc.*, not forgetting "*iodospongin*," an iodine compound from sponge, containing 8.2 per cent. of iodine.—Apoth. Ztg., Nov. 30, 1898, 838.

Hydrocarbons.

(*Including Volatile Oils.*)

Acetylene—Explosive Value for Motive Power.—Frederick Grover has conducted a series of experiments in order to determine the value of the application of acetylene gas to internal combustion engines. He found that no weaker mixture than 18 volumes of air to one of acetylene gas can be exploded at atmospheric pressure, 15 to 1 being the weakest mixture of coal gas and air that can be fired under the same conditions. The researches point to the usefulness of acetylene in engines where coal gas is now ordinarily used, and show that it will compete effectually with other methods of obtaining motive power.—Pharm. Journ., March 11, 1899, 227; from Science Gossip, *58*, 294.

Glycerole of Terebene—A New Antisepeic.—A Russian physician has employed a glycerole of terebene, prepared as follows, with success as an antiseptic dressing: A mixture of 7 parts of glycerin, 1 part of water, and 4 parts of terebene is placed into a separator of 5 or 6 liters capacity, the tubulure of the separator being fitted with a cork carrying two tubes, one of which passes to the bottom of the liquid. With this arrangement air is occasionally drawn through the fluid, the mixture being frequently shaken during a fortnight at the ordinary temperature. The lower stratum, which originally consisted of the glycerin and water, gradually changes during this period so as to form an opaque, viscous mass, having the aromatic odor of terebene. This is the glycerole, which is used in the form of compresses of tarlatan impregnated with it. It is said to be an energetic disinfectant, and to promote the rapid healing of wounds.—Bull. Commerc. xv., 466.

Dextro-Terpineol — Production from Linalol.—When linalol is acted upon by acetic anhydride, a strongly dextro-rotatory crystalline terpineol is formed, according to K. Stephen. This melts at 35° C. Glacial acetic acid only acts upon linalol when heated, with the formation of this dextro-terpineol. The so-called "licarhodol" obtained by Barbière by saponifying the acetylized products of linalol, is stated by the author to be nothing but this terpineol with linalol and geraniol.—Pharm. Jour., Jan. 7, 1899, 1; from Journ. f. prakt. Chem., *58*, 109.

Caryophyllene—Study of Addition Products.—Prof. Edward Kremers reports the results of some interesting studies made in the laboratory of the University of Wisconsin by Oswald Schreiner and Charlotte F. James upon certain derivatives and addition products of caryophyllene, a large

quantity of which had been placed at his disposal by Messrs. Fritzsche Bros., of Passaic. The caryophyllene having been made on a relatively large scale, it was deemed of interest to note some of its physical properties. It is a colorless, oily liquid, with an odor resembling that of cloves and turpentine. Its sp. gr. at 20° is 0.90320. Following the interesting experiments of Wallach, the authors have succeeded in preparing a number of new addition products and derivatives, which, possibly owing to the scarcity of material, were not prepared by Wallach. The study of these new derivatives also enables a comparison of the corresponding derivative and addition products of "humulene," which Chapman at one time supposed to be a body identical with caryophyllene. The following table will readily set forth both analogy and differences between caryophyllene and humulene, as far as they have been determined:

	Caryophyllene.	*Humuene.*
Hydrate	m. p. 94— 95°	m. p. Not crystalline.
Nitrosochloride	" 158—160°	" 164—165°
Nitrosate	" 147—150°	" 162—163°
Nitrosite	" 107°	" 120—121°
Isonitrosite	" 53— 56°	" 165—168°
Nitrol piperidine	" 141—142°	" 153°
Nitrol benzylamine	" 125—128°	" 136°

Several other derivatives of caryophyllene have been prepared by the authors, but inasmuch as no attempts to make the corresponding derivatives of humulene have been recorded, a further comparison is impossible at present.—Pharm. Archives., Nov., 1898, 209–215.

Citral—Detection and Determination in Essential Oils.—Tiemann, in an exhaustive paper, reviews the history of the investigations connected with citral from the time of its first description and introduction into commerce (1888) to the present time. He also describes a new derivative of citral, obtained by the condensation of citral with cyano-acetic acid as a readily crystallizable compound which is well adapted for the detection and determination of citral in essential oils. To prepare this compound a solution of cyano-acetic acid ($C_3H_3NO_2$) in three parts of water is mixed with two molecular proportions of caustic soda in the form of a 30 per cent. solution, and one molecular proportion of citral is shaken with the alkaline liquid. When pure citral is used it dissolves completely and, on acidifying, the

Citraliden-cyano-acetic acid separates as an oil, which at once becomes crystalline. After recrystallization of the acid from warm benzene or a mixture of it with petroleum spirit, it is obtained in the form of yellow crystals which melt at 122°C, and have the composition $C_{13}H_{17}NO_2$. If an essential oil containing citral is shaken with an alkaline solution of cyano-acetic acid, the citral may be completely separated from the other constituents, and, after shaking the alkaline liquid with ether, the citral con-

densation product may be obtained, almost quantitatively, by acidifying the alkaline liquid.—Pharm. Journ., Jan. 21, 1899, 51, from Berichte, *31*, 3001 and 3329.

Citral—Estimation in Essential Oils.—O. Doebner recommends a method for the determination of citral in essential oils, which depends upon the production of alkyl-naphto-cinchonic acids by the reaction of pyrouvic acid and β-naphtylamine with aldehydes. By heating 40 Gm. of citral with 24 Gm. of pyrouvic acid and 40 Gm. β-naphtylamine dissolved in 200 Cc. of absolute alcohol, he obtained 40 Gm. of citryl-naphto-cinchoninic acid, melting at 197° C., and from the mother liquor about 4 Gm. of mixed acids melting at 140°–160° C., which gave on fractional crystallization, among other products, an acid melting at 225° C., and having the composition of citronellyl-naphto-cinchoninic acid. By the same process the amount of citral in lemon oil (*citrus limonum*) was found not to exceed 7 or 8 per cent., and other oils contained still less, with the exception of

Lemon-Grass Oil (*Andropogon Citratus*), which contains 82 per cent. of citral under the same conditions of experiment, and yielded also 3 Gm. (=7.5 per cent.) of mixed acids melting at 240°–260° C. (? Rep.). These results confirm the previous observations of Schimmel & Co. that lemon-grass oil contains from 80 to 82 per cent. of citral. By further experiments, the author has determined that citral is the only aldehyde present in lemon-grass oil in any considerable amount, and that consequently by condensation with acetone and alkaline reagents by Classen's method, the same products would be obtainable as from pure citral, viz.,

Pseudo-Ionone ($C_9H_{15}.CH = CH.CO.CH_3$), and *Ionone* ($C_{13}H_{10}O$). This conclusion is in accord with Tiemann's observation, that by condensation with acetone, lemon-grass oil yields a very pure pseudo-ionone, and it is now confirmed by results obtained by the author. Mr. Doebner also disputes the statement in the specification of an English patent that the product of the action of chlorinated lime upon a mixture of lemon-grass oil, acetone and alcohol differs from pseudo-ionone, and does not yield ionone when treated with sodium bisulphite, but is converted into one or more different ketones, having the formula $C_{13}H_{20}O$. His further experiments have shown that the ketone of violet odor obtained under these conditions is identical with the ionone obtained by acting upon pseudo-ionone obtained from citral. The statement made in the specification mentioned, that the violet oil obtained under the patented process contains no ionone, is therefore incorrect.—Pharm. Journ., Sept. 3, 1898; from Berichte, *130*, 1888.

Cinnamic Aldehyde—Supply in a Pure Condition Absolutely Free from Chlorine.—Schimmel & Co. extol the advantages of pure cinnamic aldehyde, which is now supplied absolutely free from chlorine. It is preferable to natural cassia oil because, while equally well adapted for applica-

tions in perfumery, confectionery, and the manufacture of liquors, preserves, etc., it is very light in color, and therefore specially adapted for flavoring light-colored soaps, and on account of its price, which is no higher than that of common cassia oil, and, by comparison, cheaper than the best.—Schimmel's Report, October, 1898, 10.

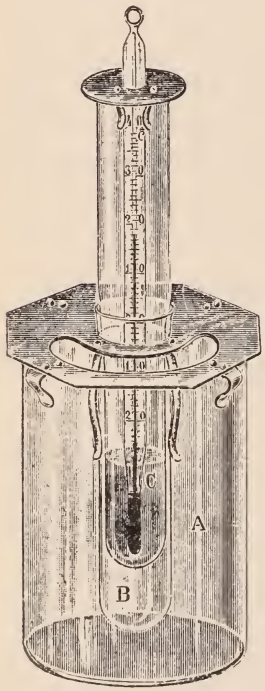
Volatile Oils—Solubility Value.—Edwin Dowzard recommends that in addition to the physical tests applied in the examination of volatile oils, such as specific gravity, optical rotation, etc., the solubility test should receive more attention and should be applied in a uniform way so that proper comparison may be made. He therefore recommends the following method which possesses several advantages: (1) only one strength of alcohol is necessary; (2) the results represent the actual solubility; and (3) they are directly comparable. Five Cc. (accurately measured) of oil are mixed with 10 Cc (accurately measured) of alcohol (sp. gr. .799 at 15.5° C.); water is then run into the solution from a burette until the solution becomes turbid. The end-reaction is very distinct. Oils of great solubility usually give an opalescent solution before becoming turbid. The number of cubic centimeters of water required to produce turbidity is multiplied by 100, the result being termed the "solubility value." The determination of the solubility by this method only occupies a few minutes, and its advantages over the old method are obvious. The following table gives the results which have so far been obtained:

Oil of	Solubility Value.	Number of Samples	Sp. Gr. (15.5° C.)	Optical Rotation. 100-Mm. tube.
Anise	120–130	3	.981– .987	to —1° 25′
Bergamot	235–255	4	.883– .8845	+ 12° to + 15°
Cajuput	450	1	.923	—1° 30′
Cananga	265	1	.916	21°
Caraway	250–290	3	.911– .917	+ 74° to + 79°
Citronella	335–350	3	.902– .906	— 10° to — 12°
Clove	740–780	4	1.048–1.054	to — 1°
Coriander	520–530	2	.870– .875	+ 9° to + 12°
Dill	320–330	2	.907– .915	+ 72° to + 75°
Geranium	575–595	4	.895– .898	—7° to —10°
Lavender (Eng.)	520–560	4	.885– .891	— 8° to — 9°
" (French)	490–500	3	.888– .895	— 5° to — 8°
" (Spike)	470–495	2	.908– .913	+2° to + 3° 30′
Lemongrass	460–470	2	.900– .902	— 1° to — 3°
Nutmeg	120–125	2	.885– .905	+ 14° to + 16°
Orange	60	2	.849– .851	+ 91° to + 98°
Pennyroyal	460–475	2	.925– .936	+ 21° to + 23°
Peppermint (Amer.)	200	1	.909	—22°
" (Eng.)	360–460	4	.905– .906	— 23° to — 25°
Pimento	730–780	4	1.045–1.049	— 1° to — 4°
Rosemary (Eng. and French)	285–325	3	.913– .916	+ 2° to + 9°
Rue	450–465	2	.835– .837	+ 1° to + 2°
Sandalwood (E. I.)	390–400	6	.975– .978	— 17° to — 18°
Sassafras	130–145	3	1.065–1.069	+2° to + 3° 30′
Savin	190	1	.922	+ 53°
Tansy	475	1	——	——
Thyme	290	1	.910– .924	— 3° to — 5°
Turpentine (Amer.)	50	1	.860	+ 7°

The sp. gr. and optical rotation figures added are the averages for pure oils, determined within the past twelve months, and in a few cases refer to those oils whose solubility values are given.—Chem. and Drugg., Nov. 5, 1898, 749.

Volatile Oils—Apparatus for Determining Solidifying Point.—Messrs. Schimmel & Co. (Report, October, 1898, 43) call attention to a modification of Beckmann's apparatus for the determination of the molecular weight from the decrease of the freezing point, which makes it particularly useful for determining the solidifying point of essential oils. The alterations consist mainly in the removal of the cork connections, by which the full view of the mercurial column of the thermometer was impeded, while the lateral branch of the freezing tube, *C*, of the Beckmann's apparatus is omitted as unnecessary. The modified apparatus is shown by Fig. 60. The battery jar, *A*, serves for receiving the refrigerating fluid. The test-tube, *B*, suspended in the metal cover serves as air-cover around the freezing tube, *C*, and prevents the premature solidification of the oil under examination. This tube is widened at its top, narrowing down at the junction where it rests on the rim of the test-tube, *B*. In order to support the tube *C* in the tube *B*, three glass protuberances are affixed on its inside about 5 Cm. below its upper rim. The thermometer, divided into ½ degrees, is supported in a metallic cover by three small springs, permitting its ready movement upwards or downwards. In use, for the determination of star anise oil for instance, the jar is filled with ice water and broken ice, or other suitable freezing mixture, the sample of oil is introduced into the freezing tube, *C*, to the height of about 5 Cm., and the thermometer is inserted into the oil with the precaution not to touch the wall of the tube in any place. Concussions also have to be avoided during the experiment, to prevent premature solidification. When the thermometer has reached about 10° below the suspected point of solidification, the solidification is induced by gentle friction or stirring with the thermometer. On solidification the thermometer rapidly rises to the maximum height, called the point of solidification of the oil.

FIG. 60.



Beckmann Apparatus (Modified).

Volatile Oils Containing Hydrocyanic Acid—Additional Plants Yielding Such.—Recent investigations made in the laboratory of the Botanical

Garden at Buitenzorg, Java, have added a number of plants to the ones long known as yielding hydrocyanic acid upon distillation. Four of them belong to the *passifloræ*, viz.: *passiflora laurifolia*, L., *P. hybr. imp. eugenie*, *P. princeps*, Lodet, and *tasconia spec.* Two others are *plectronia dicocca*, Benth., belonging to the *rubiaceæ*, and an *amygdalae*, *prunus javanica*, Mic., containing with hydrocyanic acid, also benzaldehyde, while the latter alone, with traces of salicylaldehyde, was found in the leaves of *homalium tomentosum*, Benth., and also in two species of *memecylon*.—Schimmel's Report, April, 1899, 47.

Oil of Turpentine—Adulteration with Gasoline.—Lyman F. Kebler calls attention to a sample of oil of turpentine, which, while excelling in cheapness, was found to be adulterated with gasoline. The analytical data were as follows: Specific gravity, 0.8306 at 15° C.; boiling point, the liquid began to come over at 80° C., and when 100° was reached about 25 per cent. had passed over. The temperature continued to rise until 170° C. was reached. The fraction with the low boiling point had a specific gravity of about 0.7813 at 15° C. The solubility of the turpentine was normal. The residue, however, was excessive. This turpentine contained at least 25 per cent. of a petroleum product, probably gasoline.—Amer. Drug., Aug. 25, 1898, 97.

"Juniper Wood Oil"—Examination and Character of Commercial Samples.—The prominence into which the so-called "juniper-wood oil" has recently been brought, has prompted E. J. Parry to make some inquiries respecting the source and character of this oil. All the samples of this oil that have been examined by the author possess the general characters of turpentine, except that the dextro-rotation is sometimes lower than that of American turpentine, or the oil is lævo-rotatory. This, however, is not sufficient evidence to state that turpentine is invariably the chief ingredient of the oil. Juniper-wood yields a small quantity of volatile oil, but this never comes into commerce, and has no connection with the so-called "juniper-wood" oil. Inquiries addressed to the makers of this oil recall the fact that it is made in one or the other of the following methods:

1. Turpentine is distilled over juniper-berries or the berries and twigs.
2. A small quantity of pure juniper oil is mixed with turpentine.
3. The waste terpenes from the manufacture of "concentrated" oil of juniper are sold as "juniper-wood oil."

These facts are surely sufficient to condemn the use of such a term as "ol. juniper. exot." to this product. In examining this oil it should be noted that the sp. gr. is easily made to fall within pharmacopœial limits, and the optical rotation can also be adjusted by the use of French and American turpentine. The oil is characterized by the absence of any, or any appreciable, fraction distilling at 265°–280° C. Pure juniper oil yields from 12 to 16 per cent. at this temperature, which is chiefly the sesquiterpene cadinene.—Chem. & Drug., April 29, 1899, 690.

Oil of Cade—Unsatisfactory Quality.—Paul Adam has investigated the character of oil of cade as at present supplied, and determined the density, viscosity and general composition in five samples. The result shows this product to vary so much in its composition and character, that it will probably be dispensed with in the future. Thus, its viscosity varies between 32 and 360, while its specific gravity ranges from 0.9874 to 1.031. —Pharm. Journ., August 27, 1898, 241; from Bull. Soc. Chim. de Paris, xix., 580.

Oil of Cade—Observation of a Surprisingly Small Percentage of Cadinene.—For the purpose of comparison with the cadinene from the volatile oil of angostura bark, of which it is a prominent constituent, J. Troeger and P. Feldman endeavored to prepare some of the pure substance from oil of cade by the process of O. Wallach, but obtained it in surprisingly small quantities. The chief constituent of oil of cade proves to be an inactive oil, a sesquiterpene, which constitutes a lemon-yellow fluid boiling at 250° to 260°. It seems, furthermore, probable that during the formation of the oil the dextrorotatory constituents become inverted, since all the constituents of the oil which have been treated with hydrobromic acid exhibited comparatively strong laevogyre properties.—Arch. d. Pharm., 1898, *236*, No. 9, 692–696.

Oil of Lemon—Practical Observations Concerning the Sicilian Product. —Franc. Ant. Corio, writing from Messina, Sicily, communicates some practical information concerning the collection of the fruit and preparation of oil of lemon. The true Sicilian oil of lemon is obtained by pressing the rind of the lemon by means of a sponge, which, when thoroughly saturated with the oil, is afterwards squeezed into a receptacle made especially for the purpose. This method of procedure is called "making hand-pressed lemon oil," but, as it is not possible to squeeze all the oil out of the rind by means of a sponge, the skins are then turned over to another department where they undergo the operation of being further squeezed by means of machinery, but oil so pressed has not such a fragrant odor as that pressed by means of the sponge. Although the "hand-pressed" lemon oil is unanimously declared to be better than the "machine-pressed," still there are many obstacles in the way which render "machine-pressed" oil preferable to the former, and this for the reason that the sponges used amongst the peasants here in Sicily may perhaps have been in use for such a long time, and have been let to lie about, and so collect the dust, thus imparting to the oil so pressed a distinct "spongy" odor, which, by an inexperienced person, would be taken for rankness, and be declared as adulterated, although in reality it is perfectly pure. Chemical tests, in the author's opinion, are quite unreliable. Take the citral test, for instance. As every one knows, a lemon pressed in the month of March will give a higher percentage of citral than one pressed during the month of November, when the pressing of new crop oil com-

mences, and the fruit is still green. Yet no one can dispute that for fineness and delicacy of flavor, combined with natural strength, "November-pressed lemon oil" cannot be beaten. The majority of perfumers will have nothing but "November-pressed" oil. If, however, they buy according to citral percentage, they certainly do not get "November-pressed" oil; besides, fruit of later cuts costs the merchant less. Again, optical rotation and sp. gr. vary according to temperature, districts from whence the fruit is obtained, and many other things which prevent the reliability of the results obtained. Oil of lemon and turpentine both belong to the family of terpenes, yet, by a little manipulation, it is practically an easy matter to arrange the lemon oil given for analysis so that the required optical rotation is given, even when adulterated with rectified oil of turpentine. It follows that the expert buyer must depend upon some other tests, and among these none deserve more attention than that of smell. By the "nasal test" it becomes quite easy to detect the presence of oil of turpentine, which by skillful manipulation of the adulterator may escape discovery by the usual chemical tests.—Pharm. Era, July 7, 1898, 7–8.

Lemon Oil—A New Constituent.—John C. Umney and R. S. Swinton call attention to an odorous constituent of lemon oil which has heretofore been overlooked. It appears to be an ester of geraniol, which is present to the amount of 1.2 to 1.4 per cent.. Experiments point to acetic acid as being the acid naturally in combination with geraniol to form this ester. With the isolation of citral it was originally believed that the odorous principle of lemon oil had been discovered, and various theories were advanced to account for the difference in odor and taste between natural lemon oil and a mixture of the terpene of lemon oil with citral in the relative proportion in which they were understood to exist. Subsequently it was found that citronellal was associated with citral, and had some influence upon the taste and odor of the oil, but it was also found that no blend of these two aldehydic constituents, no matter in what proportion they existed, possessed the peculiarly sweet character of the natural oil. From their present investigation the authors conclude that the missing link is found in the ester of geraniol, now isolated by them for the first time, and they express the belief that it is necessary that a concentrated lemon oil shall contain not only citral and citronellal, but also this ester of geraniol in normal proportions, before it can be said to represent in a concentrated form the true odor and taste of lemon oil.—Proc. Brit. Pharm. Conf., 1898, 368–370.

Concentrated Lemon Oil—Essential Characters and Preparation.—In connection with the foregoing paper some notes on "concentrated oil of lemon" by T. H. W. Idris, who has had a life-long practice in the manufacture of aërated waters, are highly interesting. After discussing the subject of lemon oil and of the various preparations of it as supplied to the manufacturers of mineral waters, the author observes that of the

numerous preparations offered the so-called "terpeneless oils" have been an introduction of decided utility, but that these oils as sent out by the makers differ considerably. He therefore calls attention to a method by which the lemon aldehydes can be separated from lemon oil without much change and in a state of comparative purity. Fractional distillation of lemon oil cannot be carried out at the normal pressure of the atmosphere without considerable change in the oil and in the products. But this difficulty is overcome by fractional distillation under reduced pressure, and he advises that under these conditions 85 per cent., or better 90 per cent. of the oil be distilled over at a temperature below 100° C. The residual 10 per cent. is an oily liquid which, on cooling, deposits a white sediment. The gravity is about 0.902 to 0.905. If this 10 per cent. of residuum is then subjected to distillation by passing steam through it, a pale yellow oil is carried over and floats on the water. This amounts approximately to 6 or 7 per cent. of the original oil, and possesses to a marked extent the pure lemon aroma. The 85 or 90 per cent. of distillate and the final residue of 3 to 4 per cent. possess very little lemon odor. The latter portion solidifies on cooling.—Proc. Brit. Pharm. Conf., 1898, 370–373.

Oil of Sweet Orange (*Essence de Portugal*)—*Constituents.*—J. Flatau and H. Labbe have determined in essence of Portugal both myristic acid and myristicol. A new ether has also now been found; it has a very agreeable odor, very characteristic of oranges. It melts at 64° to 65°, and is easily soluble in ether, benzene and chloroform in the cold, difficultly so in warm alcohol; it is almost insoluble in cold alcohol, light ligroin and boiling water. In an etherized solution a large quantity of bromine is absorbed; after driving off the ether and washing with cold alcohol we obtain a pale yellowish powder, melting at 56° to 57°, easily soluble in ether, cold benzene and chloroform, and insoluble in ligroin and boiling alcohol. Analysis shows the presence of a large quantity of bromine in the molecule of this new compound.—Chem. News, Aug. 19, 1898; from Bull. Soc. Chim., xx., No. 8.

Neroli Oils—New Constituents.—E. and H. Erdman, who are engaged in the study of the ethereal oils of the flowers of *Citrus aurantium amara*, L. (*citrus bigarade*, Dick), have found in the fraction distilling above 150° C. under 10 Mm. pressure, after saponification with alcoholic potash, among other products, a crystalline acid having a sweet and acrid taste, which they have determined to be identical with

Anthranilic Acid.—It appears to exist in very small quantity in the form of a methyl-ester, which by suitable treatment was obtained as an acicular crystalline hydrochloride, melting at 178°. The

Methylester of Anthranilic Acid crystallizes in large crystals with numerous facets, melts at 24.5°, boils at 127° under 11 Mm. pressure, and the specific gravity is 1.163 at 26°. It is readily soluble in dilute mineral

acids, alcohol and ether, but only slightly soluble in water. The crystals of the ester have a blue fluorescence, becoming more marked when dissolved in ether or oil, and the fluorescence of neroli oil is doubtless due to the presence of this substance. The authors have also found that the lowest boiling fraction of a certain kind of neroli oil gives a distinct reaction, showing the presence of a

Pyrrol Derivative.—This reaction is, however, most distinct in the "pommeranzen oil" from unripe fruits produced by Haensel, the vapor of which gives a blue coloration in a firwood splinter moistened with hydrochloric acid. As yet no definite results have been obtained in the endeavor to determine the nature of this pyrol compound.—Pharm. Jour., June 10, 1899, 524; from Berichte, *32*, 1213 and 1217.

Ol. Succini Rect.—Falsification of the Commercial Article.—The attention of E. M. Holmes having been directed to the ol. succini rect. of commerce, the low price of which precludes its preparation from so expensive material as amber, or even from "*Zanzibar anime*," the resin often sold as amber, the author found on inquiry that the commercial rectified oil of amber is one of the products of the destructive distillation of resin. Among these products is one, yielded to the amount of a little over 3 per cent., and called "resin spirit." It is quite a complex mixture of hydrocarbons and aldehydes, and when rectified finds industrial application in place of turpentine for the preparation of varnishes, etc. It is this substance, rectified to a certain specific gravity, which it is believed is sold as ol. succini rect. at a low price, the true oil, prepared from amber clippings or fragments, costing nearly as much per ounce as does the factitious article by the pound. Experiments made by Mr. Swinton in the laboratory of Mr. J. C. Umney, at the author's request, show the commercial ol. succini rect. and the rectified resin spirit to resemble each other closely. The spirit had the sp. gr. 0.864; the ol. succini rect. the sp. gr. 0.850. The optical rotation in both is inactive or slightly lævogyre. Fractionation also gave fairly concordant results. The resin spirit yielded 25.7 per cent. below 160°, 60.7 per cent. below 200°, and 15.7 per cent. above 200°; while the yields from ol. succini rect. for the same temperatures were respectively 25.5, 55.7 and 27.7 per cent. The ol. succini rect. is acid to litmus paper.—Pharm. Journ., Feb. 4, 1899, 98.

Portuguese Lavender Oil—Source, Characters, Etc.—Schimmel & Co. (Report, October, 1898, 31,), describe a specimen of oil of lavender received from Portugal, which is obtained from

Lavendula pedunculata, Cav., indigenous on the Iberian Peninsula. Its odor is rather indistinct, and not pleasant. Its sp. gr. is 0.939, its optical rotation $a_D = -44°54'$, and it is soluble in an equal volume of 80 per cent. alcohol. Its high figure of saponification, 111.7, corresponds to 39 per cent. of the acetic acid ester of an alcohol, $C_{10}H_{18}O$. The saponified oil,

when distilled, yields a light yellow liquid containing cineol and probaly also thujone.

Spike Oil— Detection of Turpentine Oil. — Schimmel & Co. (Report, October, 1898, 41), state that small additions of oil of turpentine may be made to spike oil without thereby perceptibly altering its physical constants. The oil of turpentine, however, passes over with the first fraction of the distillate when the suspected oil is subjected to fractionation, and is readily detected by determining the angle of rotation of the first fraction. In all specimens of spike oil of reliable origin thus far examined, the first 10 per cent. of distillate was fouud to show dextrogyre rotation. An admixture of French oil of turpentine, too small to be detected in the entire oil, would show in the first fraction of 10 per cent. by its lævogyre rotation. The criterion of pure oil of spike, so far as has been determined to the present, is as follows: Specific gravity not below 0.905; dextrogyre rotation; solubility in 3 parts of 70 per cent. alcohol.

Eucalyptus Oils.—Valuable sorts obtainable from "*stringy-bark trees*," which see under "Materia Medica."

Eucalyptus Oil—Precautions in Assay.—The requirement of the British Pharmacopœia, 1898, that eucalyptus oil shall contain a considerable percentage of eucalyptol, has induced D. B. Dott to record the results of the determination of that constituent in several samples of eucalyptus oil and of commercial eucalyptol, with the object of showing the possible variation in results when the usual method of determination—conversion of the eucalyptol into phosphate by treatment with syrupy phosphoric acid—is followed. As usually conducted, the process consists in mixing the oil with phosphoric acid of 1.75 specific gravity, pressing the magma till it ceases to yield anything to blotting paper, decomposing the residual eucalyptol phosphate with water, and weighing the separated eucalyptol. This method is liable to show variations according to the amount of water used to decompose the eucalyptol phosphate, the number of washings to which the eucalyptol has been subjected, or the temperature, the eucalyptol being soluble to a certain extent in water. If cold water is employed, the separated eucalyptol is liable to hold some phosphate in solution, and to show excessive results; if hot water is employed, there is considerable loss by eucalyptol being dissolved. A simpler way would appear to be the weighing of the press-cake remaining after repeated pressing between blotting-paper; but to insure the complete removal of the terpenes and uncombined acid, this is quite a tedious process. A third method, and one which on the whole seems to be the best, consists in determining the amount of phosphoric acid in the press-cake by titration with soda and calculating the equivalent in eucalyptol on the basis that one molecule of phosphoric acid equals one molecule of eucalyptol.—Pharm. Journ., Jan. 21, 1899, 57–58.

Oil of Eucalyptus — Remedial Value in Headache.—The value of eucalyptus oil in the treatment of headache was mentioned by Lewis and de Schweinitz as long ago as 1889. It has since been found of great service in the treatment of frontal headache caused by cerebral congestion, and has succeeded where acetanilid, antipyrine, bromides and other remedies have failed. It is given in doses of 5 minims every four hours, and is particularly useful for those cases which are found in patients of a gouty tendency. — Pharm. Jour., July 16, 1898, 50; from Therap. Gaz. (3), xiv., 237.

Volatile Oil of Eucalyptus loxophleba—Characters.—See *E. loxophleba*, under "Materia Medica."

Oil of Eucalyptus Punctata—Chemical Investigation.—In view of the distribution in commerce of eucalyptus oils from different species without proper designation of source, R. T. Baker and H. G. Smith have undertaken an investigation of these oils at the Technological Museum, Sydney. They now report on the volatile oil from *eucalyptus punctata*, D. C., locally known as the grey gum tree, which grows plentifully in New South Wales, and yields an oil comparable to that of *E. globulus*, a tree which does not grow in this colony to any extent. The authenticity of the several parts of the plants experimented upon having been established, the leaves from trees of different sizes—young and mature and from suckers—were distilled during May and June, and nine oils thus obtained. A mixture of equal volumes of these nine oils yielded 55.11 per cent. in the first fraction, and 62.6 per cent. in the second fraction. The oil does not contain phellandrene, but with the nitrite test it becomes of an emerald green color, differing in this respect from the oil of *E. globulus*. The crude oil contains aldehydes, among which cuminic aldehyde is present in small quantity. The amount of eucalyptol varies unless the leaves are taken from the same tree, averaging in the crude oils from 46 to 64.5 per cent. —Pharm. Journ., Oct. 22, 1898, 437; from Journ. Roy. Soc. N. S. Wales, xxxi., 260–280.

Oil of Melaleuca Viridiflora—Medicinal Value.—The volatile oil of *melaleuca viridiflora* has been introduced into medicinal use under the name of

Gomenol, being recommended as efficient in tuberculosis and in the treatment of affections of the respiratory organs. It is given in capsules containing 0.25 Gm. of the oil, 4 to 10 being given daily. It is stated in "Pharm. Zeit." (Sept. 17, 1898, 667), that "gomenol" has also been found useful as a remedy in rheumatism and neuralgia, as well as in form of a 2 per cent. injection in inflammation of the bladder.

Oil of Melaleuca Viridiflora—Composition and Medicinal Value.—The essential oil of *melaleuca viridiflora*, a plant indigenous to New Caledonia, contains according to Dobourquet de Labordenier 66 per cent. of cineol,

some terpineol, traces of butyric, valerianic, and acetic esters, and a terpene, but is free from aldehydes which are contained in the oils of cajuput and of eucalyptus. The oil has given good results in the treatment of tuberculosis and other respiratory affections, in affections of the urinary system, and in cystisis, being given in the latter case in 2 per cent. solution hypodermically. The oil is also valuable as an external application in rheumatism and neuralgia. Internally it is given in dose of 25 centigrammes four to ten times daily. It is imported under the names of "gomenol" and of "oil of niouli."—Pharm. Journ., August 27, 1898, 241; from Bull. Gèn de Thèrap., cxxxvi., 1.

Oil of Peppermint—Solubility in Alcohol.—In a criticism on the Germ. Pharm. tests for peppermint oil, Conrady calls attention to the variability in the solubility of pure peppermint oil, from different sources (Mitcham, American, German, Japanese) in 70 per cent. alcohol. He instances a Japanese oil which formed a strongly opalescent solution with 4 vols., but clear solution with 5 vols. of 70 per cent. alcohol. On fractionating this oil, the first fraction required 9 vols. of 70 per cent. alcohol for clear solution; the four succeeding fractions, 3½, 2½, 2, and 2½ vols., respectively.—Apoth. Ztg., Dec. 14, 1898, 870.

Oil of Peppermint—Commercial Quality.—Louis Schulze has examined four samples of oil of peppermint by the tests of the U. S. Pharm. He finds two to have the sp. gr. 0.920, the others, 0.918 and 0.917, respectively. The lighter samples, though having the characteristic odor, possessed a less strong aromatic odor and taste, and were deficient in menthol, while the heavier samples conformed well to the official tests.—Proc. Md. Pharm. Assoc., 1898, 83.

Menthol and Borneol—Compounds with Formaldehyde—A. Brochet, by treating menthol and borneol with formaldehyde, has succeeded in obtaining dimenthol and di-borneol-formal.

Dimenthol-formal, $CH_2(OC_{10}H_{19})_2$, is a white solid body, having a peculiar odor, quite distinct from that of menthol. It melts at 56.5° C., is insoluble in water, insoluble in cold alcohol, but readily in warm alcohol, crystallizing from it in long, felting, silky needles.

Diborneol-formal, $CH_2(OC_{10}H_{17})_2$, separates after several crystallizations from alcohol in pearly scales, melting at 166° C., and distilling without decomposition, under ordinary pressure, at 344°–345° C.—Pharm. Journ., April 29, 1899, 383; from Compt. rend., cxxviii., 612.

Monarda Oils—Chemical Composition.—Edward Kremers reports on the chemical composition of monarda oils obtained from authentic specimens of *monarda punctata*, L., and *monarda fistulosa*, L., respectively, by students in the University of Wisconsin. The

Volatile oil of Monarda Punctata was distilled from plants collected during a very dry part of the season in the forepart of August, 1897, near

Arena, Wis., and identified by Prof. Cheney. The oil was of a light amber color, and possessed a rather pleasant, mint-like odor. Its sp. gr. was 0.932 at 15° C. It was almost inactive towards polarized light. It contains 60 per cent. of a phenol which is principally composed of thymol, $C_{10}H_{13}OH$, but it also contains apparently some carvacrol. Of the non-phenol portion of the oil, about 10 per cent. is an alcohol, the larger portion of the remainder consisting of cymene, $C_{10}H_{14}$, together with a little dextrogyrate limonene, $C_{10}H_{16}$. Besides these few constituents there are doubtless small quantities of others, for the identification and study of which larger quantities of material are necessary. The

Volatile Oil of Monarda Fistulosa was distilled from identified plants in 1894, 1895, 1896, and again in 1898. The latter is now under process of investigation. This contained about 68 per cent. of phenols; but here the conditions are reversed, the phenols being composed mainly of carvacrol, with, at the outside, not more than 2 per cent. of thymol, if indeed any of this is present at all.—Pharm. Archives, April, 1899, 73–78.

Thymol—Compound with Formaldehyde and Iodine.—A new compound of thymol with formaldehyde and iodine is obtained, according to "Ztschr. f. angew. Chem." (1898, 1037), as follows: 100 Gm. thymol and 100 Gm. formalin are heated together with stirring, and 100 Gm. of conc. hydrochloric acid are added after a certain time; violent reaction ensues, and a viscid oil soon separates, which on cooling congeals to a crystalline mass. This is

Thymolformaldehyde, which is purified by pulverizing the crystals, washing on a suction filter with water, and dried. From this an iodine compound,

Iodothymoform, is prepared as follows: 41.6 Gm. of the thymolformaldehyde are dissolved in 50 Cc. of alcohol, 12 Gm. of finely powdered potassium iodide and 32.8 Gm. of iodine are added to the solution, and the mixture is gently heated for one hour in a flask provided with a reflux condenser. The product so obtained, after moderate cooling, is treated with ammonia in excess, and the precipitate produced is collected and thoroughly washed upon a suction filter with water. The iodothymoform is so obtained in practically the theoretical quantity. It has a brown-yellow color, and is decomposed at a temperature of 150°.—Apoth. Ztg., Nov. 12, 1898, 799.

Camphor—Solubility in Concentrated Hydrochloric Acid.—C. Istrati and A. Laharia have observed that camphor is markedly soluble in concentrated hydrochloric acid. On adding water a precipitate is formed, which redissolves on adding more water. It is considered probable that there is a definite chemical combination effected between the hydrochloric acid and the camphor—probably a chlorhydrine—since on evaporation *in vacuo* the solid obtained has a markedly lower melting point than pure

camphor. The camphor appears to be more soluble at a lower than at a higher temperature, a few degrees making a decided difference. Thus a concentrated syrupy solution prepared at 0° C., containing over 40 per cent. of camphor, will speedily become solid if the flask containing it is held in the hand, but again liquefied on cooling to 0° C.—Pharm. Journ., Dec. 3, 1898, 583; from Compt. rend., cxxvii., 557.

Oil of Sassafras—Separation on Standing.—Chas. H. LaWall calls attention to the fact that oil of sassafras when exposed to cold will separate into two layers, a denser and a lighter, and under great cold, of course, the lower layer will contain crystals of safrol. He instances several controversies in his own experience in which it was claimed that an oil was of too low a specific gravity, when afterwards it could be shown by thoroughly mixing the contents of the vessel, that the oil had the right sp. gr., which in genuine unadulterated oil is accepted as varying between the limits of 1.07 and 1.09. Thus an oil poured from the top may show a sp. gr. as low as 1.06, as in a case cited, while the lower portion shows a sp. gr. of over 1.08—the mixed oil having the sp. gr. 1.07. It is important also that the sp. gr. should be taken at the right temperature, viz., 15° C. In a case cited, the sp. gr. had been found low; but on inquiry it was found to have been taken at the temperature of the room (28° C.); when the sp. gr. of the same oil was taken at 15° C., it was found to be 1.071. While a sp. gr. below 1.070 is looked upon with suspicion, occasional lots of genuine sassafras oil have a sp. gr. below this, as shown by the following table representing an aggregate of about 10,000 pounds of oil as it comes from the distiller:

Sp. Gr.	*Maximum.*	*Minimum.*	*Mean.*
1896	1.0840	1.0500	1.0654
1897	1.0850	1.0610	1.0736
1898	1.0830	1.0450	1.0713

The color varies from deep yellow to nearly colorless, and there is a difference noticeable in the odor of different lots.—Proc. Pa. Pharm. Assoc., 1898, 134–137.

Safrol—Observation of Electric Condition.—Gustav Hamelbeck, filtering some safrol through an ordinary filter placed in a tin funnel into a glass flask, observed that the safrol became markedly electric. If a metallic object or the finger was brought within 10 Mm. of the funnel, electric sparks were emitted from it. Upon pouring the safrol in drops upon the filter, they appeared to be attracted to the surface when within 5 or 10 Mm. of it, and drawn towards the center of the filter contents.—Chem. Ztg., 1899, 129.

Dill Oil—Low Specific Gravity of German Oil.—Messrs. Schimmel & Co. protest against the imputation implied in Mr. Umney's paper that the low specific gravity of German distilled dill oil is due to the prevailing

practice of separating the carvol. While the sp. gr. 0.9002 is a low one even for German dill oil, it is shown in a table giving the sp. gr. of twelve specimens of dill oil of their own distillation—eight being from Thuringian dill and the other four from Russian, English, Spanish and Indian dill respectively—that a low specific gravity is by no means uncommon, that pure dill oil may even have a still lower specific gravity than 0.900, and that even English dill does not always yield an oil of as high specific gravity as that mentioned by Mr. Umney. In the case of the oils mentioned in the table, those obtained from English and Spanish dill were so rich in phellandrene as to show the reaction for that substance at once when acted upon by sodium nitrite and acetic acid, while with the German oils this reaction could only be obtained by applying the test to the lower fractionates obtained from a greater quantity of oil. So far as the distinction between the oils of European and Indian (and Japanese) dill is concerned, Flückiger and Hanbury have already pointed out (Pharmacographia, p. 328) botanical distinctions between the European and Asiatic plants, which led them to designate the Asiatic species by the name *anethum sowa*.—Schimmel's Rep., Oct., 1898, 19–21.

West Indian Sandal-Wood Oil—Botanical Source.—The known differences in the specific gravity and other characters of West Indian and East Indian sandal-wood oil, as well as the fact that, while the latter oil is derived from *santulum album*, no species of *santalum* is known to occur in the West Indies or South America, has induced E. M. Holmes during the past several years to make inquiries in different directions in order to ascertain the source of the West Indian oil. Information received through Messrs. Schimmel & Co. in 1886, together with twigs and leaves received from the British Vice-Consul at Puerto Cabello, Venezuela, pointed to a rutaceous plant as being the probable source, and this is now confirmed by flowers and fruits of the plant received through the Messrs. Schimmel. But while the plant is evidently a *rutacea*, a careful inspection proves it to belong to a hitherto undescribed genus, the fruit being one-celled and one-seeded, and the plant pinnate leaved—characters which do not occur together in any known genus of the

Rutaceæ.—The author, therefore, and in compliment to the Messrs. Schimmel & Co., proposes the name of *Schimmelia* for the new genus, and *Schimmelia oleifera* for the species yielding the West Indian sandal oil, and accurately describes the principal characters which distinguish the new genus and the new species, the description being illustrated by cuts showing the flowering branch, flowers, fruits, leaves, etc. The author remarks that although the leaves and inflorescence approach those of the *zanthoxyleæ* in character, it differs from that group in not having polygamous flowers, nor a separable endocarp, and in the one-celled ovary. In the shape of the ovary, the hermaphrodite flowers, and exalbuminous seeds, it approaches the *aurantiæ*, but differs in the dry one-celled pericarp and solitary seed.—Pharm. Jour., Jan. 21, 1899, 53–54.

Heracleum Oil—Character of the "Octaldehyde" Obtained From It.—Messrs. Schimmel & Co., having recently distilled the volatile oil from the fruits of *heracleum sphondylium*, prepared from octylic alcohol contained this oil and first obtained by Zinke, the

Octaldehyde by oxidation with potassium chromate and sulphuric acid. This hitherto unknown aldehyde has a strong odor recalling œnanthol. When purified by its bisulphite compound, it boils at 60° to 63° C. under 10 Mm. pressure, and has the sp. gr. at 15° C. of 0.827. By the action of β-naphthylamine and pyrouvic acid,

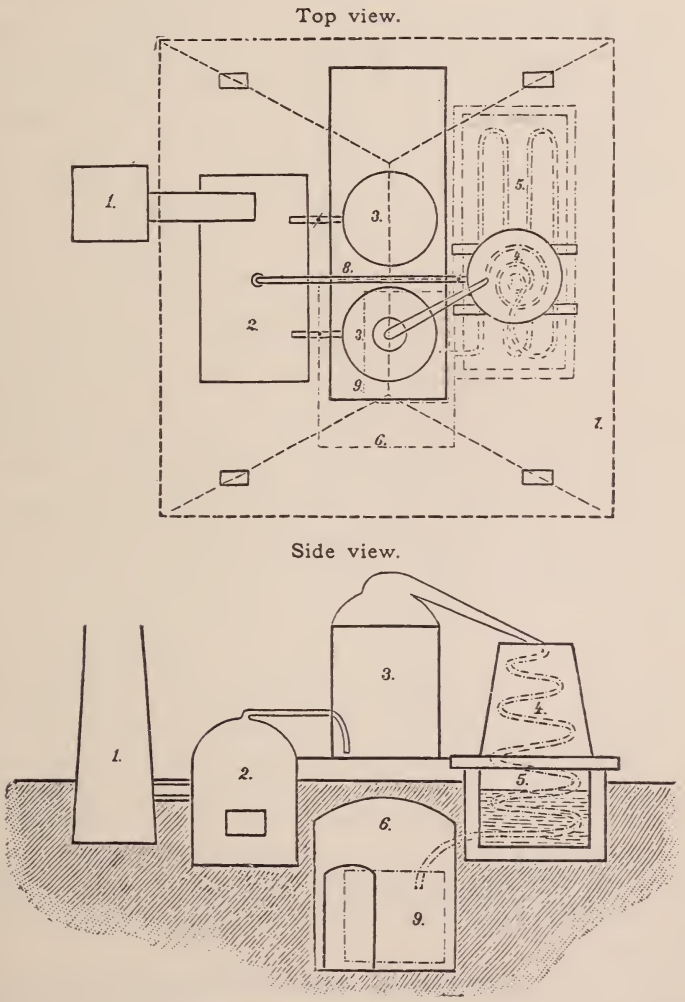
Octyl-β-naphtocinchonic acid is obtained in form of fine white crystals which, when recrystallized from alcohol, melt at 234° C. With phosphonium iodide octylaldehyde combines, forming a compound which melts at 115.5° C.—Schimmel's Rep., April, 1899, 26.

Caparrapi Oil.—A Columbian Substitute for Copaiba.—According to B. F. Tapia, the oil obtained from *nectandra caparrapi*, has been long used in Columbia as a substitute for copaiba, the tree yielding it being locally known as "*canelo*," probably on account of the cinnamon-like odor of the bark. The commercial oil is more or less dark, in consequence of the heat employed to remove water in admixture; otherwise it would be almost colorless. It contains a crystalline mono-basic acid, $C_{15}H_{26}O_3$, melting at 84.5° C., the remainder of the oil consisting largely of a sesquiquiterpene-alcohol, $C_{15}H_{26}O$, called caparrapiol, which is readily converted by dehydrating agents into a hydrocarbon, caparrapene, $C_{15}H_{24}$.—Schimmel's Report, October, 1898, 8; from Bull. Soc. Chim. de Paris (3), 19, 638.

Citronella Oil—Production on Ceylon.—Karl Fritzsche has communicated to Messrs. Schimmel & Co. an interesting and valuable account of the production of citronella oil in Ceylon, his studies of the subject being aided by Volkart Brothers in Galle. The number of acres of citronella grass under cultivation is estimated at from 40,000 to 50,000, the amount of oil exported during the year 1897 being 1,182,867 lbs. Omitting the details concerning the cultivation of the grass and the harvesting of the crop, the following concerning the distillation of the oil will be found of particular interest. The author visited plantations in the neighborhood of Galle, as well as in the citronella district, in the country between Matara and Akurressa, as far as Henegama. The distilleries are located at the base of the ridges and hillsides, where cool water is to be had in sufficient quantity, and are generally recognized in the barren tropical landscape by their low and clumsy chimneys, about 13 feet high. In most cases the construction is by no means the alleged primitive one, and it is surprising how well the natives, who constitute the large majority of producers, have succeeded in the construction of their distilleries, a typical plant being shown by the accompanying cut (Fig. 61) in top and side

view. They are generally located under a protecting shed (*1*), and consist of a steam boiler (*2*) resting on a solid foundation and provided with a water-gauge and safety-valve ; of two cylindrical iron stills (*3*), mostly 6 to 7 feet high and 3 to 4 feet in diameter ; these are furnished with a common interchangeable alembic and are connected with a large wooden tub (*4*) con-

FIG. 61.



Citronella Oil Distillery.

taining the serpentine cooler, and underneath this an oblong basin (*5*) through which the serpentine tube passes for a final cooling of the distillate. This is collected in a receiver (*9*) situated in a subterranean receptacle or cellar (*6*), capable of being locked so as to prevent pilfering of the oil. The

distillation consists in directly introducing steam without addition of water to the grass. The warm water passing from the cooler through the pipe (*8*), is used for feeding the boiler. The only thing abnormal is that the diatillate is collected and preserved without a prompt separation of the oil and the water, the reason for this being that the coolies employed are prone to steal, and cannot be entrusted with the collection of the pure oil. When a certain amount of distillate has accumulated in the large receiver in the cellar, the proprietor bottles the oil in bottles holding 22 ozs., while the aromatic water is allowed to run away. Each distillation requires about 6 hours, or longer, since labor does not count for much; the force required for the management of a distillery of the capacity described consists of 10 women for cutting and binding the grass into bundles, 3 coolies for loading and bringing it to the distillery, and 3 more for attending to the boiler and still. The output is from 16 to 20 bottles of 22 ozs. of oil per day, and this also is the average yield of oil from an acre of ground during the summer crop, while the winter crop yields only 5 to 10 bottles per acre. In some distilleries direct heat is applied to the common still, in which case, of course, the grass is distilled with water; but steam is used in the majority of cases.—Schimmel's Report, October, 1898, 11–15.

Guaiacum Oil—Botanical Source.—In the April, 1898, number of "Schimmel's Report" (p. 29, see also Proceedings, 1898, 986) the statement was made that the botanical origin of the guaiacum wood, called "*palo balsamo*" in Argentina and yielding the so-called guaiacum oil, is still unsettled. Messrs. Schimmel & Co. have since been informed by Dr. Paetzold of the Pharmaceutical Institute of the University of Strassburg that he has ascertained the origin of the wood beyond a doubt, and that it is derived, as has been intimated in the "Report" above cited, from *bulnesia sarmienti*, Lor., a tree 40 to 60 feet high, belonging to the *zygophyllaceæ* and closely related to *guaiacum officinale*. The tree, according to Griesebach, is indigenous in the Argentine provinces of Oran and Grande Chaco. Concerning the demand for the oil, which is a splendid perfume, representing the pure odor of the finest tea, it is stated that it does not yet meet with appreciation by perfumers and manufacturers of toilet soaps, and that the wood has recently been thrown upon the market in such quantities as to occasion a loss to the importers unless a far more extensive application of the oil is made.—Schimmel's Report, October, 1898, 29.

Guaiacum Oil—Characters.—F. Dietze, confirming the observation of Schimmel & Co. that "guaiacum oil" is used as an adulterant of rose oil, has subjected it to nearer examination and determined the following constants: sp. gr. at 35° = 0.9695; opt. rotation in 100 Mm. tube = 6° 40′ at 35°; acid number = 1.46; ester number = 2.47; saponification number = 3.93; melting point—begins in capillary tube at 41° and is complete at 48°. Solubility—readily and completely in 90 per cent. as well as in

70 per cent. alcohol. Residue of evaporation = 22.2 per cent. The author expresses the opinion that the guaiacum oil of commerce is not singly the product of guaiacum wood, but that it is a mixture of guaiacum, geranium, rose oil, and of another undetermined substance. This commercial oil also possesses greater rotatory power and, unlike the pure oil, does not form a clear solution with diluted (70 per cent. [?], Rep.) alcohol.—Pharm. Ztg., Nov. 5, 1898, 793.

Rose Oil—Adulteration with Oil of Guaiacum Wood.—Messrs. Schimmel & Co. (Report, October, 1898, 38) call attention to a sample of Bulgarian oil of rose which had been adulterated with guaiacum wood oil. Guaiacum oil (which see) has the property of solidifying with a fine crystalline structure at the ordinary temperature, it consisting mainly of an alcohol melting at +91°. This fact has evidently inspired some compounder to utilize the oil for restoring the strong tendency to crystallization of those adulterated rose oils whose degree of solidification has been impaired by too considerable an admixture of geranium oils; the property of readily solidifying being still considered an imperative criterion of quality in Bulgaria. Guaiacum oil, having a mild tea-like odor which is easily blended with that of rose oil, such an admixture is not easily noticed, even when made in considerable proportion.

Geranium Oil—Chief Constituents.—The statement of Schimmel & Co. that the chief constituents of Indian geranium oil are equal parts of acetic and caproic acids, is contradicted by the experiments of Flatau and Labbé, who find that the chief ester is a compound of geraniol with an isomer of myristic acid, from which the latter only differs in having a lower melting point, viz., 28.2° C., instead of 53.8° C. The analytical numbers obtained from the silver, barium and calcium salts are all in accordance with the formula $C_{14}H_{28}O_2$. Besides this, acetic acid and traces of valerianic acid were isolated. Bourbon geranium oil did not yield the new body. It contains about one per cent. of an acid having the formula $C_{10}H_{18}O_2$, half of which exists in the free state, the other half as a geranyl-ester.—Pharm. Journ., August 20, 1898, 217; from Compt. rend., cxxvii., 29.

Jasmal—The Synthetic Odorous Principle of Jasmine.—A. Verley has succeeded in isolating and subsequently in synthetizing the chief odorous principle of jasmine, which is stated to be the methylene acetal of phenylglycol, and which he has named jasmal. It is obtained by heating 50 parts of phenylglycol on a water-bath with 300 parts of water, 125 parts of sulphuric acid, and 100 parts of formaldehyde. A light oily layer is quickly formed, which is removed by ether and rectified by distillation in vacuo. Jasmal so obtained has the characteristic odor of jasmine, and agrees in its properties with jasmal isolated from the flowers. Like that body, it is destroyed by distilling with acidulated water, but it is very stable in cold water and in alcoholic solution. It boils at 218° C. at

ordinary pressure, and has a density of 1.1334 at 0° C.—Pharm. Journ., April 29, 1899, 383; from Bull. Soc. Chim. (3), *21*, 226.

Hyacinth Oil.— Synthetic Production.— Messrs. Schimmel & Co. announce the successful production of synthetic hyacinth oil. By dissolving a few drops of this "Hyacinth" in alcohol and comparing the odor of this solution on blotting paper with that of blooming hyacinth, the identity as to the fragrance between the two is claimed to be striking.—Schimmel's Report, April, 1899, 26.

Volatile Oil of Cochlearia Officinalis, L.—Preparation and Properties.— In view of the failure of experiments to isolate the glucosidal constituent of *cochlearia officinalis*, L., which produces the pungent volatile oil from this plant resembling mustard oil, Dr. J. Gadamer has subjected the volatile oil to new investigation. He obtained this oil from the dried herb, "without blossoms," after maceration with white mustard seed and water, by distillation with steam, the yield being 0.236 per cent. This yield may possibly be increased when the oil is prepared on an industrial scale, since the preliminary assays pointed to 0.305 per cent. as the probable yield. Heretofore the yield from the green herb has been given as 0.008 per cent. The natural oil is optically active, the figure for the crude oil being determined as + 55.27°. It differs from mustard oil in being a butyl instead of an allyl-sulphide, while the synthetic cochlearia oil of commerce is an isobutyl sulphide.—Apoth. Ztg., Sept. 28, 1898, 679.

Methyl Salicylate—Cause of Differences Observed in the Boiling Point. —In view of the different boiling points of methyl salicylate given by different writers, Adrian undertook the fractional distillation on two samples, one essence of winter-green and the other salicylate of methyl, and found that pure salicylate of methyl distils over between 220° and 223°, and that its density at 15° is from 1.15 to 1.20. It is nearly insoluble in water, but dissolves easily in alcohol and in ether. It takes a violet color on the addition of perchloride of iron in a dilute aqueous solution. This ether is a true acid, and combines with potash, forming a crystalline salt. If we place one volume of methyl-salicylic ether in a stoppered flask with five or six volumes of concentrated ammonia, the ether disappears after a time; on the liquor being evaporated and the residue distilled, we obtain a yellow mass which crystallizes in needles by dissolving in boiling water. This substance is salicylamide, which by the action of acids regenerates the ammonia in the form of a salt, and forms salicylic acid. The density and boiling point of salicylate of methyl are important indications of its purity; it may contain non-etherized methylic alcohol if the product is not properly washed, or methylic or ethylic alcohol added by fraud. The presence of either of these foreign bodies will notably lower the density and the initial point of distillation; a simple washing with distilled water will, however, suffice to purify the salicylate. This body may also be adulterated with a fixed oil, but the density will

again be lowered, and, after distilling at 2 $\frac{8}{0}$°, a residue will be left, which will give off characteristic vapors of acrolein on being heated to a higher temperature.—Chem. News, July 22, 1898, 47; from Journ. de Pharm. (6), vii., No. 9.

Methyl Salicylate—Natural Occurrence and Wide Distribution in Plants.—Dr. van Romburgh, of the Botanical Garden at Buitenzorg, Java, furnishes additional proof of the wide distribution of methyl salicylate in the vegetable kingdom. Of 900 different plants examined for volatile constituents, 160 yielded a distillate containing more or less of this ester. None of these plants, however, yielded distillates that gave the methyl salicylate reaction when the plants were subjected to distillation on the same day they were gathered, but did so when distilled one day after. This observation sustains the inference made by Bourguelot, Schneegans and Gerock some time ago that methyl salicylate is fixed in plants as a glucoside compound. Methyl salicylate was found by Dr. van Romburgh most frequently in leguminous plants, but it was also found in one or more species of the families *aurantiaceæ*, *celastrineæ*, *compositæ*, *cupuliferæ*, *ebenaceæ*, *euphorbiaceæ*, *gramineæ*, *jasmineæ*, *lonicereæ*, *meliosmeæ*, *myrtaceæ*, *piacineæ*, *polygaleæ*, *rhamneæ*, *rosaceæ*, *rubiaceæ*, *sapindaceæ*, *staphyleaceæ* and *tiliaceæ*. The ester is contained sometimes only in one or more organs, sometimes in all parts of the same plant.—Schimmel's Report, October, 1898, 45; from Proc. Acad. Science, Amsterdam.

Continued researches at the Buitenzorg Botanical Garden have shown that the following families also include species that yield methyl salicylate among the products of distillation: *Acanthaceæ*, *arctocarpaceæ*, *apocynaceæ*, *asclepiadaceæ*, *bixaceæ*, *bignoniaceæ*, *burseraceæ*, *chrysobalanaceæ*, *dilleniaceæ*, *menispermaceæ*, *myristicaceæ*, *myrsineæ*, *pomaceæ*, *samydaceæ*, *sapotaceæ*, *styraceæ*, and *violaceæ*.—Ibid., April, 1899, 46.

Resin—Composition.—Dr. R. Henriques has made a series of researches in order to determine the composition of colophonium. He finds that it contains no esters at all, only small quantities of acid anhydrides, and that it is mainly composed of free resin-acids and unsaponifiable components. The resin acids may be separated by means of petroleum ether into soluble normal acids and into insoluble acids having the character of lactonic acids. The normal acids only give an acid number, while the insoluble acids give besides the acid number also a very high saponification constant.—Apoth. Ztg., June 7, 1899, 343.—Chem. Revue, 1899, 106.

Resin—Products of Destructive Distillation.—In view of the scant information concerning the products of the resin industry in works on Materia Medica, Mr. Holmes has collected such information as was available, and communicates it in concise review in his present paper, which, indeed, is under the caption of "Resins, Resin Oils and Resin Spirits," but must be consulted in the original. It may suffice here to state that there are two methods followed for the destructive distillation of resin or

colophony, the one by the application of fire heat alone, the other by the aid of superheated steam in addition to fire heat. Of these, the first method is the one usually employed, the products being, according to information given by a practical manufacturer, Mr. C. W. Colthrup, as follows: Gas, 5.2 per cent.; acid water, 2.7 per cent; crude resin spirit, 3.2 per cent.; crude resin oil, 85 per cent.; resin pitch, 3.9 per cent. The "Crude Resin Spirit" is of a dark brown color, but when refined by treatment with sulphuric acid, caustic soda, redistillation and washing, is colorless, has a specific gravity of from .876 to 0.883, is insoluble in water and in alcohol, but is soluble in ether, turpentine and petroleum spirit. Though varying in both the above specific gravities, it is invariably heavier than oil of turpentine, for which it is the best known substitute, and capable of replacing it for all purposes when of good quality, the chief objection being in its odor, which is not so pleasant as turpentine—Pharm. Journ., Feb. 4, 1899, 98–99.

Coal Tar—Purification for Medicinal Use. — Dr. O. Schweissinger observes that the coal tar of commerce contains suspended impurities, particularly finely divided coal (carbon), which interfere materially with its use for preparing various medicinal preparations. He has experimented with various solvents, with the view to its purification, and finds that either acetone or benzol will answer this purpose admirably. Either of the solvents may be used in the proportion of 3 parts to 1 part of the tar. The filtrate, which may be augmented by washing the filter, is evaporated (distilled), the yield being on an average about 80 per cent. of

Purified Coal Tar. This is a thick-liquid, brown-black mass, translucent in thin layers, completely soluble in acetone or benzol, but only partially soluble in absolute alcohol or ether, and very sparingly in ordinary alcohol. On the whole, the author prefers acetone to benzol for the purification of coal tar, because the solution is more manageable and more readily filtered than that obtained by benzol. Ointments are easily prepared with different bodies—lard, lanolin, petrolatum—and do not stain the skin.—Pharm. Centralh., 1898, 933.

Coal Tar, purified by dissolving it in benzol and distilling the filtrate at 80° C. until a thick liquid black-brown mass remains, is described by Dr. Troplonitz under the name of

Liantral.—While easily soluble in benzol and its homologues, it is only partially soluble in fixed and volatile oils, in alcohol, ether, acetone, benzin and mixtures of these. The author recommends the following formulas for liantral preparations which have been found efficient in his practice:

Oleum Liantrali: Liantral, 10.0; olive oil, 90. Filter.

Liantral Spray: Liantral, 10.0; ether, 90.1. Filter.

Sapo Kalin. c. Liantral: Liantral, 5.0 to 10.0; potash soap, to make 50.0.

Pasta Zinci c. Liantral: Zinc. oxydat, 12.5; terr. silicic. (powdered quartz) 2.5; liantral, 2.5 to 5.0: adip. benzoat, ad 50.0.

Liantral Dusting Powder: 1 to 5.0 liantral are dissolved in ether, mixed with equal parts of starch and powdered talc to make 100.0 when the ether is completely evaporated.

Tinctura Liantrali Æth.: Liantral, 10.0; spir. æther., ad 100.0.

Tinctura Liantral Comp.: Liantral, 10.0; pyrogallic acid, 2.5 to 5.0; spirit of ether, ad 100.0.

Tinct. Liantral Saponinata, an improved form of

Liquor Carbonis Detergens, is made by macerating 20.0 cort. quillajæ in 100.0 spiritus dil. during 8 days, adding 20.0 liantral, shaking occasionally during 8 days more and then filtering.

Ung. Refrigerans c. Liantral: Liantral, 2.5 to 5.0; anhydrous lanolin, 30.0; dist. water, to make 50.0.—Monatsh. f. prakt. Derm., 1899, 134; Apoth. Ztg., Feb. 18, 1899, 90.

ALCOHOLS AND DERIVATIVES.

Ethyl Alcohol—Question of Synthesis.—Frank Wood observes that according to the text-books it was quite an easy matter to synthesize ethyl alcohol. All that is necessary is to convert acetylene into ethylene by means of nascent hydrogen, or by passing a mixture of acetylene and hydrogen through a red hot tube; the ethylene so produced is then passed into hot concentrated sulphuric acid, and the ethyl sulphuric acid thus formed yields ethyl alcohol on distillation with water. The author tried this method, the method which depends upon the production of ethylene by decomposing a mixture of calcium carbide and zinc dust by dilute sulphuric acid, and that depending on its formation from copper acetylide and zinc dust by the action of ammonia, but in no case obtained either ethylene, or, from the product of the reaction, anything like ethyl alcohol. The author has been unable to meet with the article of the original person whose statements have since inspired a whole succession of text-book writers to assert that ethyl alcohol can be synthesized as before explained, and expresses a reasonable doubt as to the reliability of such assertion.—Chem. News, Dec. 23, 1898, 308.

Alcohol—Preparation and Yield from Sawdust.—E. Simmson has obtained on an experimental scale 6.5 litres of absolute alcohol from 100 kilos of air-dry sawdust containing 8 per cent. of moisture. The sawdust is heated in a converter under a pressure of 9 atmospheres for a quarter of an hour with water containing 0.5 per cent. of sulphuric acid. The yield of sugar is between 22 and 23 per cent. of the air-dry sawdust, and the solution obtained, after neutralization, is readily fermented with yeast. Experiments recently made on an industrial scale establish the practicability of the method beyond question. It is immaterial what kind of saw-

dust is used, though birch wood appears to give a somewhat larger yield of sugar than the sawdust from pines or hemlock. Shavings also answer well, but must be cut into small transverse discs, on account of the otherwise great bulkiness. A necessary condition to the effectual conversion is that the liquid throughout the process shall maintain an acidity of at least 0.5 per cent. During the conversion the acidity increases, through formation of acetic acid and possibly others, the nature of which has not been determined. The yield of alcohol has been increased to as much as 7.2 liters per 100 kilograms of sawdust (in one experiment as much as 7.7 liters), this corresponding to about 75 per cent. of the sugar produced and determined by Fehling's solution. The quality of the alcohol produced is satisfactory.—Apoth. Ztg., Nov. 5, 1898, 776; from Ztschr. f. Angew. Chem., 1898, 98.

Alcohol—Determination in Presence of Ether.—Speaking of the determination of the amount of alcohol present in tincture of lobelia, B. P., Edwin Dowzard observes that this is a difficult matter owing to the presence of ether. He succeeds, however, by the following method, which depends upon the fact that alcohol forms a compound with calcium chloride, while ether does not: Mix 50 Cc. of the tincture in the distilling flask with about 25 Gm. of anhydrous sodium sulphate, and then add a large excess of powdered anhydrous calcium chloride, so that the contents of the flask have the appearance of a solid mass. After standing about 10 minutes, the flask is immersed in water at 40° C., and a current of air is blown through the flask until all odor of ether has disappeared. Water is then added, and the alcohol distilled off in the usual manner. As applied to the tincture named, the process is quite accurate, as confirmed by an example given.—Pharm. Journ., Feb. 25, 1899, 170.

Alcohol—Determination in Liquor Iodi Fortis, British Pharmacopœia, 1898.—Alex. Gunn recommends the following method for determining the amount of alcohol in liquor iodi fortis, as well as in tinct. iodi. A strong solution of sodium hyposulphite is added in just sufficient quantity to decolorize the iodine solution; this is followed by the addition of caustic potash to saturate the sulphurous acid formed, and the alcohol may then be distilled off and calculated in the distillate in the usual way. Neither of the reagents will answer by itself. In the presence of caustic potash the result is vitiated by the formation of iodoform, while with hyposulphite alone, the sulphurous acid produced will contaminate the distillate.—Pharm. Journ., Sept. 17, 1898, 330.

Alcohol—Tests for Limit of Acidity and Fusel Oil.—Feodor Miehle calls attention to the presence of undue quantities of free acid and fusel oil in alcohol sold in the German markets. He finds the tests of the Germ. Pharm. insufficient to detect objectionable quantities of these, and proposes the following as giving more reliable results:

If 25 Cc. of the alcohol be carefully mixed with 1 drop of phenol-

phthalein solution, the mixture should not require more than 0.15 Cc. of normal alkali to produce a red color.

If 4 Cc. of alcohol be mixed with 1 Cc. of chloroform, the mixture then shaken with 4 Cc. of distilled water, and the chloroform allowed to separate, a few drops of the chloroform carefully removed by means of a pipette and dropped upon filter paper, should leave no odor of fusel oil after complete evaporation.—Apoth. Ztg., Nov. 12, 1898, 799.

Alcohol—Denaturation with Coal-Tar Benzin.—Dr. R. Kayser has experimented with coal-tar benzin as a material for denaturating alcohol. He finds that the addition of 5 per cent. (vol.) coal-tar benzene (b. p. 80°–180°) will denaturate 95 per cent. alcohol perfectly. With the ordinary appliances and methods it was found practically impossible to re-naturate the denaturated alcohol so obtained, while a mixture with water in the proportion usual for drinking purposes resulted in the production of a milky liquid having an extremely unpleasant and persistent taste, the alcoholic taste being completely masked. The addition of the benzene in the proportions named in no way interferes with the use of the alcohol for technical purposes.—Apoth. Ztg., June 7, 1899, 343; from Ztschr. f. Off. Chem., 1889, 186.

Samshu—A Chinese Rice Liquor.—Frank Browne, Government Analyst, Hong Kong, gives an interesting description of the method practiced in preparing "Sam Ching Chau," "Sheung Ching Chau," and "Leu Pun Chau," three kinds of Chinese liquor, differing in their alcoholic strength and now known under the name of "Samshu," though this term was originally applied to the thrice-distilled liquor, "Sam Ching Chau," exclusively. The single distilled (half material) liquor,

"*Leu Pun Chau*," is the most popular of the Samshus, its alcoholic strength varying between 50.9 and 62.6 *under proof*. It is prepared by boiling rice with an equal quantity of water for half an hour, draining off the liquor, cooling, dividing the rice into a number of pots, adding the rice liquor, and a certain proportion of ferment, known as "Chau Pang," together with a little water. This ferment is composed of rice, bean flour, red earth, and leaves which are stated to be cassia leaves. It is imported from Canton, but is manufactured at Honan, and is usually in dry flat cakes. The mixture is allowed to stand from 23 to 28 days, after which the contents of three of the pots are transferred to a still, which is shown in illustration and described, but must be referred to in the original. From 27 parts of rice, fermented with 4.5 parts of "Chau Pang," 30 parts of distillate—Leu Pun Chau—are distilled. With the aid of this, the twice distilled liquor

"*Sheung Ching Chau*" is prepared, three pots representing 27 parts of the fermented rice together with 10 parts of Leu Pun Chau being distilled so as to obtain 30 parts of distillate. The alcoholic strength of this

liquid varies from 42.4 to 53.5 under proof. Finally, the thrice distilled liquor, "*Sam ching chau*," is prepared by placing three pots of the fermented rice and 30 parts of leu pun chau into the still, and distilling 30 parts. The alcoholic strength of this varies between 15.0 and 22.6 under proof. All of these liquors contain some free acid (0.078 to 0.279 per cent.), compound ethers (0.205 to 0.321 per cent.) and higher alcohols (0.032 to 0.068 per cent.), together with faint trace of furfuraldehyde. Leu pun chau is the staple beverage, and is preferred to the others, which are not liked for habitual use on account of their greater strength in alcohol; for samshu is never diluted, the stronger liquors, sheung ching chau and sam ching chau, being drunk only in small sips, while of leu pun chau as much as a catty (1⅓ lb. Av.) or even more is drunk on festival days by some Chinese without producing intoxication.

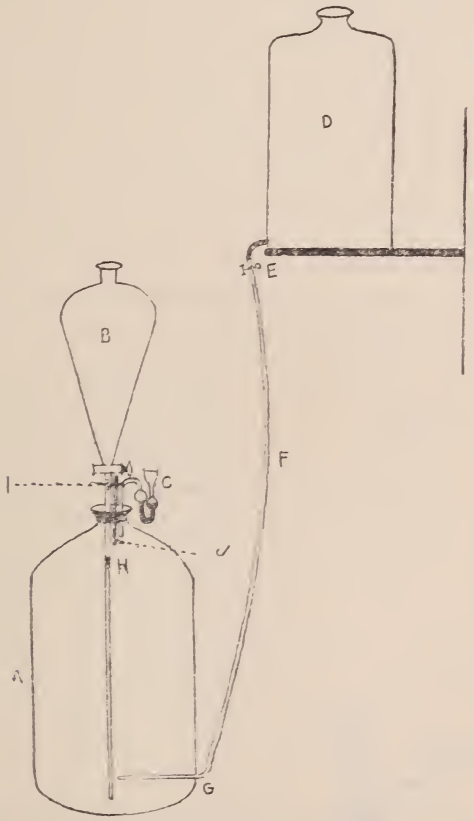
Samshu is a colorless liquor, and has a characteristic odor. The term is sometimes applied to other liquors prepared from it by the addition of other substances, or to a liquor prepared by a similar process from molasses and properly called "Fa Chau." The compounded beverage contains in addition to Leu Pun Chau and sugar the substances named after their titles, as follows: "Chin Mui Chau"—sour plums; "Mau Kan Chau"—*Triticum* repens; "Chang Chau"—oranges; "Mui Kwai Chau"—limes; "Ka Pi Chau"—a bark known as "Ka Pi"; "Muk Kua Chau"—papaws. The author observes that the factories where these various products are made are kept in a clean condition, and that, while the cheapest rice is used, it is in no case unsound.—Pharm. Journ., Oct. 29, 1898, 460–461.

Ethyl Nitrite—Modification of Dunstan's and Short's Process for Preparing the Solution.—J. Spilsbury recommends the following as being a simple and efficient modification of Dunstan's and Short's process for preparing solution of ethyl nitrite: Take of sodium nitrite (95 per cent.) 12 ozs., 45 grains; sulphuric acid, 8 ozs., 114 grains; alcohol, 1 gallon (Imp. meas.). The sulphuric acid is gradually mixed with half the alcohol, keeping it cool by surrounding the vessel with cold water, and this is added to the other half of the alcohol containing the sodium nitrite. A glass vessel of the capacity of about 1½ gallons well-stoppered is all the apparatus required. The mixture is shaken about twice a day until the reaction is complete. That may be ascertained by periodically testing a sample, the reaction being ended when solution of barium chloride ceases to give a precipitate and the solution is only faintly acid.—Pharm. Journ., April 1, 1899, 309.

Ethyl Nitrite—Simple Apparatus for making it in Quantities.—H. J. Henderson, after an experience for a number of years with the method of preparing ethyl nitrite proposed by Dunstan and Dymond eleven years ago (see Proceedings, 1888, 488), describes a simple apparatus for carrying out the process on a more extensive scale than is contemplated in the

original process. The apparatus is shown by Fig. 62. A stout glass bottle, *A*, of about 12 litres capacity, is provided with an outlet, *G*, into which a round cork bearing a glass tube is tightly fitted. The neck of *A* should be about two inches in diameter, and is fitted with a close-grained stopper, through which three holes have been neatly bored. A piece of

FIG. 62.



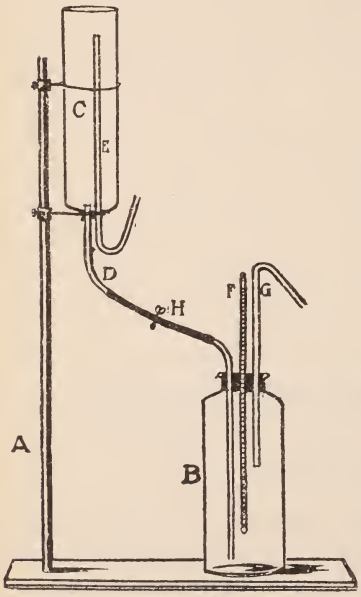
A. Bottle containing sodium nitrite solution. B. Separator. C. Safety tubes containing mercury. D. Bottle containing cold water. E. Clip. F. Rubber tube. G. Glass tube. H. Rubber joint. I. Clip. J. Outlet tube for allowing air to escape.

Apparatus for Making Ethyl Nitrite.

glass tubing, *I*, about four inches in length, is fitted into one hole, a piece of rubber tubing is slipped over the end, which is exterior, and closed with a clip. The separator, *B*, is pushed through the second hole, and connected by means of a short piece of rubber tubing, as shown at *H*, with a glass tube reaching nearly to the bottom of *A*. The third hole bears the safety bulb, *C*, which contains mercury, the thistle funnel being loosely plugged with glass wool to avoid loss of mercury by spurting. This por-

tion of the apparatus is made air-tight by pressing the stopper deeply into the neck of *A* and pouring melted paraffin around. The vessel, *D*, similar in form and capacity to *A*, contains a supply of chilled water. It is connected with *A* at *G* by means of the rubber tube, *F*, which is provided with a clip for regulating the flow. Without going into the description in detail, as given by the author, the use of the apparatus may be briefly explained as follows: A solution of sodium nitrite in distilled water, chilled in a freezing mixture of ice and salt to *below* 0° C., is placed into the generating vessel *A*. A mixture of sulphuric acid and alcohol, previously diluted with an equal volume of water, and also chilled to below 0° C., is placed into the separator *B*. The temperature of the two liquids should be as much below 0° C. as it is possible to obtain with the freezing mixture mentioned—the lower the temperature, the better the yield. Under proper precautions the acid-alcohol mixture is then allowed to flow from *B* into *A*, the valve *I* being open during the inflow, and closed after sufficient has been added for the reaction. After all of the acid-alcohol mixture has thus been added, and the reaction has ceased, the layer of ethyl nitrite is collected in the separator by withdrawing the stopper bearing it, inserting it into a stopper of the same size and having only one hole, in such manner that the end of the tube shall be just flush with the inner end of the stopper, and then allowing chilled water to flow into *A* from the reservoir *D* by opening the clip *E*. The crude ethyl nitrite thus collected is then purified in the manner recommended by Messrs. Dunstan and Dymond, with solution of potassium carbonate, cold distilled water and anhydrous potassium carbonate, etc.—Pharm. Journ., Feb. 25, 1899, 167–168.

Fig. 63.



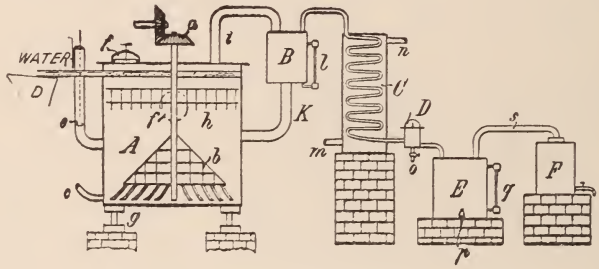
Ethyl Nitrite—Simple and Cheap Apparatus.—P. F. White suggests the apparatus shown by Fig. 63, as being suitable for preparing small quantities of ethyl nitrite conveniently. A wide-mouthed 30 oz. bottle, *B*, is fitted with a sound cork perforated with three holes, one bearing the thermometer, another a long tube, slightly curved at top, reaching to near the bottom, and the third is fitted with the bent tube *g*, the inside limb of which reaches to near the middle of the bottle. The narrow-mouthed bottle, *C*, fitted with a bi-perforated cork, is suspended in an inverted position by means of the

rings of the retort stand *A*, and bears two tubes, one of them, *E*, bent V-shaped, for the admission of air, the other, *D*, connected by a rubber tube with the long tube of *B*, with a pinch-cock, *H*, interposed, for the supply of liquid from the reservoir bottle *C*. A solution of 72 Gm. of sodium nitrite in 250 Cc. of water being placed into the bottle (or generator), *B*, this is surrounded by a mixture of ice and salt. A mixture of 27 Cc. sulphuric acid, 200 Cc. water, and 64 Cc. alcohol of 90 per cent., cooled to 0° C., is placed into the reservoir bottle *C*, and connected with *B*, the pinch-cock *H* being closed. The liquid from *C* is then allowed to run into *B* a few drops at a time, so regulating the inflow by means of the pinch-cock that the temperature may not rise above 4° C., and remains as near as possible to 0° C. When all the solution is in, shake *B* well and allow to stand. The ethyl nitrite will float on the surface of the liquid in *B*. The tube *G* is pushed down until the lower end is just above the line of demarcation between the two liquids, and the tube *D* is drawn up until clear of the liquids (first disconnecting the rubber tube), and on gently blowing through it the ethyl nitrite can be blown through *G* into a separator and purified in the usual manner.—Chem. Drug., Mar. 25, 1899, 506.

Chloroform—Modern Apparatus for its Manufacture.—In an interesting monograph, in which G. Arends reviews the history, literature and facts connected with chloroform from the date of its discovery in 1831 by Guthrie (September), Soubeiran (October), and Liebig (November), a very complete description of the different methods of manufacturing chloroform is given. It is a remarkable fact that notwithstanding the great advance in other branches of chemical manufacture, the manufacture of chloroform is to-day conducted essentially on the line laid out originally by Soubeiran and Liebig, which depend upon its production from ethyl alcohol or acetone by means of chlorinated lime. It is true, numerous other processes have been proposed, and even an electrolytic method has been attempted, but none of these are practically in use, though, for a time, its manufacture from chloral—also by a reaction determined by the discovere rof chloroform—was in vogue to some extent. The selection of alcohol or acetone depends upon the relative cost of the two in the country where chloroform is to be manufactured. In countries where ethyl alcohol is not taxed, it is cheaper to employ it than to employ acetone. The apparatus used for this purpose at the present time is shown by Fig. 64. The iron cylindrical still *A* is provided with a mechanical stirring apparatus *b* and *h*, put in motion by the cog-wheels *a*. The material is introduced by means of the man-holes *f* and *f'*, the one on top, the other on the side. Steam is admitted directly through the pipe *C*. The spent material is withdrawn after the operation at *g*. The pipe *d*, which is situated on the outside of the cylinder near the top, is perforated with numerous holes, and has for its purpose the cooling off of the contents of the still by sprinkling cold water upon the outer side when the reaction

becomes too violent. In case of an overflow of the contents of the still, their overflow passes through the tube *i* into the chamber *B*, and thence returns to the still through the tube *K*, a gauge being provided at *l* for the guidance of the operation. The distillate having passed the overflow chamber in the form of vapor, is condensed in the cooling worm *C*, and collected in the receiver *E*, the small chamber *D* being interposed so that the distillate may be examined from time to time by withdrawing a portion through the faucet, *O*. The receiver is also provided with a gauge, *g*, and is connected by means of the tube, *s*, with the safety-receiver, *F*. The operation is conducted as follows: A mixture of 30 kg. alcohol (96 per cent.), with sufficient water to make 1600 liters having been introduced into the still, the stirring apparatus is put in motion, and 400 kg. of chlorinated lime (containing 33 per cent. available chlorine) are introduced. Steam is then admitted until the mixture has acquired a temper-

FIG. 64.



Chloroform Still.

ature of 50° C., when the reaction will go on without further heating from without. Indeed, the temperature will usually rise to 60° C., and may even go higher. In the latter event cold water must be turned in at *d*, in order to cool off the contents, which otherwise may overflow into the safety-chamber, *B*, and endanger the success of the operation. When about 30 kg. of distillate have been obtained, the stirring, which has been interrupted at 45° C., is resumed, and the subsequent distillate collected separately. Finally, heat is again applied and continued as long as the distillate separates some chloroform on dilution with water. The last portion of distillate consist of alcohol and chloroform, and is used in the next operation. Instead of introducing the charge of chloride of lime, etc., through the man-hole, this is now done in many instances by suction. The chlorinated lime and water are mixed in a suitable vessel, steam is blown through the still, and the mixture is then drawn into it through a suction tube by the vacuum which forms on cooling. The further treatment of the crude chloroform is well understood, and needs no explanation here. Acetone chloroform is either prepared from acetone already

formed, or by a process in which the acetone is itself first formed from calcium acetate. The production of chloroform from chloral is quite insignificant as compared with that prepared from alcohol or from acetone either by the direct or indirect method. Germany alone produced 200,000 kilograms of chloroform in 1897.—Pharm. Ztg., July 30, 1898, 542–544.

Chloroform—Inefficiency of Lime as a Preservative. — Referring to a paper published by Dr. D. Newman and Prof. Ramsey in the "Lancet" of January 23, 1897, in which the opinion is expressed that chloroform which has undergone decomposition may be restored to good condition for inhalation, and so preserved, by shaking it with slaked lime, David Brown records the results of experiments and observations made upon a large number of samples, which show conclusively that lime is an unsuitable substance for the purpose indicated. To the contrary, it appears to hasten the decomposition. Thus chloroform of sp. gr. 1.500 with slacked lime and exposure decomposed in two days, and when of sp. gr. 1.497 it decomposed in five days, large quantities of carbonyl chloride being produced; while chloroform of sp. gr. 1.497, exposed without lime, was not decomposed after several weeks. The lime treatment should therefore be abandoned in favor of alcohol, the agent which has done its duty well for the past thirty-five years. The fear of bad effects from the action of light and air on chloroform dates back to the time when it was made and sent out of sp. gr. 1.500. When reduced by alcohol to sp. gr. 1.497, it keeps well, as was satisfactorily evidenced to the author by an examination of twenty-four samples, indiscriminately selected from 640 samples, and representing each year since 1879.—Pharm. Journ., Dec. 24, 1898, 669.

Chloroform—Decomposition by Caustic Alkali.—It has already been noted by Geuther that by the action of aqueous or alcoholic solutions of alkaline hydrates appreciable quantities of carbonic oxide are formed. Thiele and Frankland have studied the reaction and find that it is an easy matter to quickly obtain from 50 to 100 Cc. of pure carbonic oxide, if a nitrometer be filled with warm 40 per cent. potassium hydrate solution, a little chloroform added, and the mixture shaken. If chloroform and soda solution are mixed and stirred together, decomposition begins at once, and carbonic oxide and formic acid are formed. The latter may be determined by means of $HgCl_2$ in the solution previously acidified with acetic acid, being reduced to Hg_2Cl_2 by the formic acid. The copious formation of CO is in the opinion of the authors the result of the intermediary formation of dichlormethylene, CCl_2. They assume that the formic acid is produced secondarily from the carbonic oxide and alkali hydrate, and that therefore the yield of formic acid is increased with the temperature of the reaction.—Apoth. Ztg., Feb. 1, 1899, 61; from Liebig's Ann. Chem, 1898, *302*, 273.

Iodoform—Electrolytic Preparation.—K. Elbs and A. Herz give some

information concerning the electrolytic method practiced in the Chemische Fabrik auf Aktien for the preparation of iodoform by electrolysis, the process depending upon the liberation of iodine from its alkaline or alkaline earthy compounds in the presence of alcohol, aldehyde, or acetone and heat. It is a necessary condition also that the alkali set at liberty shall be at once saturated with carbonic acid, hence a current of carbonic acid must be passed through the mixture during the whole of the operation. But this can be avoided by the simple addition of an alkaline carbonate to the electrolyte, the best proportions and method being as follows: Potassium carbonate, 5 Gm.; potassium iodide, 10 Gm.; alcohol, 20 Cc.; water, 100 Cc. Every hour the iodoform deposited is collected, and the strength of the solution in potassium iodide, potassium carbonate, and alcohol is restored to the standard. The results are much less satisfactory if the alcohol is replaced by acetone. The most favorable temperature for the reaction is between 60° and 70° C. The yield of iodoform diminishes if the density of the electrolytic current exceeds 1 ampère per square decimeter. Attempts to prepare bromoform and chloroform by the same process have not been successful.—Chem. News, Nov. 25, 1898, 257; from Zeit. fur Electrochem, 1898, 113.

Iodoform—Decomposition in Solution by Sunlight.—J. Bougault finds by experiment that the decomposition of solution of iodoform exposed to sunlight is due to the intervention of oxygen. If 2 Gm. of iodoform, 30 Cc. of ether, and 30 Cc. of a 1 per cent. solution of sodium hyposulphite are hermetically enclosed in a flask of about 90 Cc. capacity and exposed to direct sunlight, the solution of iodoform undergoes a rapid partial decomposition, and continues, after occasionally shaking for a certain time, after which the solution of iodoform no longer acquires a brown color, and is no longer decomposed by light. It can now be kept for months without further decomposition; but if the flask be opened, and a fresh supply of oxygen (air) be allowed to enter, the decomposition recommences at once.—Chem. News, Feb. 10, 1899, 71; from Journ. de Pharm., (1899), viii., No. 5.

Bromoform—Cases of Poisoning.—Dr. Karl Reinecke makes a comparative statement of the cases of poisoning by bromoform that have hitherto been observed. The age of the patients varied from 3 months to 5½ years, and the quantities of bromoform taken from 15 drops to 6 Gm. Under treatment all of the patients were revived, the narcosis of the drug lasting from 10 minutes to 15 hours. A direct relation between the duration of the narcosis and the quantity of bromoform taken cannot be established. The treatment consisted in keeping the head of the patient lower than the body in a recumbent position, forcible opening of the jaws, artificial respiration, injection of camphor, of ether, or of strychnine. Inasmuch as, in most cases, bromoform had been administered to the patient for some time before poisoning had manifested itself, cumulative

action of the medicament may have to be taken into consideration.—Apoth. Ztg., July 20, 1898, 507; from Therap. Monthly, 1898, 404.

Ethylic Aldehyde—Volumetric Estimation.—Rocques has tried several methods for the volumetric estimation of ethylic aldehyde, one depending on the action of sulphurous acid, the second on that of silver nitrate in the presence of ammonia and caustic soda, and the third on the action of hypochlorites. The first method gave the most concordant results, and is carried out as follows: Two solutions are prepared, designated respectively *S* and *I*, the solution *S* by dissolving 116 Gm. of pure sodium sulphide in 400 Cc. of water, adding 100 Cc. of sulphuric acid, and making the volume up to 1 liter with pure alcohol at 96°. This is filtered on the following day. The second solution is a normal solution of iodine in potassium iodide: 1 Cc. corresponds to 0.0032 Gm. of sulphurous acid and to 0.0022 Gm. of ethylic aldehyde. The solution *S* is titrated by means of the solution *I* in the presence of starch; 10 Cc. of *S* should require 20 Cc. of *I*. To estimate the aldehyde in an alcoholic solution we place 10 Cc. in a 100 Cc. flask, add 50 Cc. of *S*, and make up to 100 Cc. with pure alcohol at 50°; in another flask we put 50 Cc. of *S*, and make up to 100 Cc. with pure alcohol at 50°; both flasks must be well shaken. On the following day take 50 Cc. of each and titrate the free sulphurous acid with solution *I*, adding about 50 Cc. of water and a little starch. If A is the number of cubic centimeters of solution *I* required by the check solution, and *a* the number required by the solution containing the aldehyde, the proportion of aldehyde present per liter will be $(A—a) \times 0.0022 \times 200$. If the solution contains less than 1 per cent. of aldehyde the solutions *S* and *I* must be diluted.—Chem. News, Mar. 10, 1899, 119; from Journ. de Pharm. 1899, viii., No. 9.

Chloral Hydrate—Remarkable Physico-Chemical Properties.—Prof. E. Schaer calls attention to some remarkable physico-chemical properties of chloral hydrate which promise to be useful, when properly exploited, in pharmaceutical as well as analytical work. It is remarkable: (1) by reason of its solubility in most solvents—as water, alcohol, chloroform, benzol, fixed and volatile oils; (2) by the solvent power of its 60–80 per cent. aqueous solutions upon a large series of both organic and inorganic substances—as alkaloids and their salts, resins, gum-resins, fixed oils, various coloring matters, etc., while, per contra, certain other substances, such as caoutchouc, gutta percha, indigo-blue, waxes, cellulose, are practically insoluble in it; (3) by the property of liquefying a large number of organic substances, such as stereoptens, phenols, organic acids, alkaloids, etc.—these, as a rule, being also very readily soluble in the concentrated aqueous chloral solutions mentioned; and (4) by its ability, in the case of starch, which is *absolutely dissolved* in chloral solution, to prevent the iodine reaction, whilst, on the other hand, in a reddish-colored chloral-starch-iodine solution, upon superimposing a layer of water, the character-

istic blue iodine-starch color is developed at the point of contact. The author will communicate in a future paper his observations concerning the numerous practical pharmaceutical and chemical applications of these remarkable properties of chloral hydrate.—Schweiz. Wochensch. Chem. u. Pharm., 1898, 402—Apoth. Ztg., Sept. 17, 1898, 656.

Chloral—Compound with Formic Aldehyde.—According to A. Pinner, formic aldehyde unites very easily with chloral in the presence of concentrated sulphuric acid, giving rise to a sort of oily molecular compound, insoluble in water, completely dissociated on distillation, and partially decomposed by water at the ordinary temperature. If, however, we use a large excess of sulphuric acid, we obtain two crystalline products having the formulæ $(C_3H_3Cl_3O_2)_2$ and $C_5H_4Cl_6O_3$, and a third resinous body. These three bodies behave in the same way as the products of condensation of chloral and the aromatic carbides described by V. Baeyer. The resinous compound has the formula $C_5H_6Cl_6O_4$; boiling alcoholic potash splits it up into oxalic and glycolic acid.—Chem. News, June 16, 1899, 287; from Berichte, Sept. 26, 1898.

Methyl Alcohol—Detection in Ethyl Alcohol.—A. Trillat proposes the following method for the detection of methyl alcohol in ethyl alcohol, which is dependent on the fact that by condensing with dimethylamine the ethylal or methylal produced on oxidizing mixtures of ethyl or methyl alcohol with potassium dichromate and sulphuric acid, the methyl compound produces a persistent blue compound becoming more intense on warming, whereas the ethyl alcohol gives a body which, under like conditions, gives a blue color that is fugitive on warming. The test is carried out as follows: Twenty Cc. of the alcohol are mixed in a flask with 300 Cc. of distilled water and 30 Gm. of potassium dichromate. When cold, 100 Gm. of 20 per cent sulphuric acid are added, and the mixture, after standing for an hour, is distilled, the first fraction being rejected. The distillate is exactly neutralized with soda, and again distilled almost to dryness. This second distillate is diluted to 400 Cc.; 100 Cc. of this is introduced into a small flask with 2 Cc. of pure dimethylaniline and 1 Cc. of 10 per cent. sulphuric acid. The flask is hermetically sealed and heated on a water-bath to 65° to 70° C. for five hours. The liquid is then made alkaline and the excess of dimethylaniline is driven off with a current of steam. A small portion of the liquid is then acidulated with acetic acid, and oxidized by lead dioxide suspended in water, when the colors, as described, will be developed.—Pharm. Journ., Sept. 24, 1898, 345; from Compt. rend., cxxvii., 234.

Methyl Alcohol—Estimation in Ethyl Alcohol.—A. Gautier describes a colorimetric method of detecting and estimating methyl alcohol in ethyl alcohol by a process of oxidation, which is evidently identical with the foregoing. When the pure alcohols were oxidized with potassium dichromate and sulphuric acid, the products of distillation contained besides

aldehyde and acetic acid, in the one case ethylal and in the other methylal. To distinguish between these two ethers, they were condensed with dimethylaniline. In the case of ethylal the resulting compound gave on oxidation a blue coloration, which rapidly disappeared under the influence of heat; while the compound produced from methylal, viz., tetramethyldiamidodiphenylmethane, gave on oxidation an intense blue coloration, deepening under the influence of heat. A quantity of methyl alcohol not exceeding 0.5 per cent. can be readily detected in absolute alcohol by this method; but certain precautions must be observed to avoid errors due to the presence of methyl alcohol as an impurity in the dimethylaniline, the necessary precautions being described.—Chem. News, Nov. 25, 1898, 267; from Compt. rend., July 25, 1898.

Formaldehyde.—Precaution in Making the Ammonia Test.—In the "Amer. Journ. Pharm." (Feb., 1898, 86–94), Carl E. Smith had reviewed and discussed the various tests proposed for assaying formaldehyde solutions, among them the "ammonia test," first proposed by Legler (see Proceedings, 1898, 1003), which is based upon the reaction of free ammonia and formaldehyde to form hexamethylene-tetramine. Lyman F. Kebler now calls attention to the necessity of allowing considerable time for completed reaction, and that it is not safe to report the per cent. of absolute formaldehyde in a solution, on a reaction continued for less than six hours. He instances an experience with a sample which was reported by him as containing 18 per cent. after a reaction of fifteen minutes. On repeating the experiment with the same solution, but allowing it to stand over night in contact with ammonia, he was mortified to find that in reality the sample contained 37.5 per cent. Subsequent experiments showed a variation of from 16 per cent. for fifteen minutes to 37.5 per cent. for six hours, the latter being the maximum contents of the sample. Amer. Jour. Pharm., Sept., 1898, 432–433.

Formaldehyde—Determination as Formic Acid.—The following method, depending on the oxidation of formaldehyde with hydrogen peroxide, and titration of the formic acid produced, is recommended by Blank and Finkenheimer as a suitable method of determination: Three grammes of the solution are mixed with 25 Cc. of double normal solution of sodium hydrate in a tall flask, 40 Cc. of hydrogen peroxide (2.5 to 3 per cent.), are gradually added through a glass funnel, and after two or three minutes the excess of sodium hydrate is titrated with double normal sulphuric acid, litmus being used as an indicator. The percentage of formaldehyde is obtained by multiplying the number of Cc. of soda solution consumed by two. The hydrogen peroxide must be tested as to acidity, and corresponding correction applied.—Ber. d. d. Chem. Gen., 31, 2979.

Formaldehyde—New Antiseptic Condensation Products.—Dr. G. F. Henning has prepared a number of new condensation products of formaldehyde which yield the latter again under the influence of alkalies or of acids, and are therefore introduced as being of therapeutic value. Thus

Thymoform—$2(C_6H_3(CH_3)(C_3H_7)O).CH_2$—is produced by condensation from thymol and formaldehyde. It constitutes a tasteless yellowish powder, having fain ly the odor of thymol, and when boiled with sulphuric acid splits off formaldehyde. It is easily soluble in ether, alcohol, chloroform and olive oil, but insoluble in water, petroleum ether, glycerin, and in solution of potassium hydrate. When iodized by one of the usual methods it produces

Iodothymoform in the form of a yellow, nearly odorless powder, which is rich in iodine, soluble in alcohol, chloroform, benzol and olive oil, and very readily in ether, while in water and in glycerin it is insoluble. Its melting point being about 150° C., it is particularly suitable for bandages which, after being impregnated with it, may be sterilized without loss of the antiseptic.

Geoform and Kreoform may be obtained from guaiacol and creosote in the same manner as thymoform from thymol. They are odorless, tasteless, non-caustic, non-irritant, and non-toxic compounds, which are soluble in solution of potassium hydrate—from which they are precipitated unchanged by acids—and easily soluble in alcohol, ether, and hot benzol, but insoluble in water and in petroleum ether.

Polyformin-insoluble, is obtained when a poly-atomic alcohol is dissolved in aqueous formaldehyde and the hot solution is treated with ammonia. These compounds possess strong bactericidal properties, and contain a high percentage of formaldehyde. The polyformin obtained in this way from resorcin is an odorous, yellowish-brown, amorphous substance, which is insoluble in all the known solvents, and is recommended as a substitute for iodoform. When 2 mol. of resorcin are combined with 1 mol. of hexamethylenetetramine,

Soluble Polyformin is produced. This is a handsome crystalline, white body, which is soluble in cold water and in alcohol, but insoluble in benzol, ether and olive oil. The aqueous solution is decomposed on heating, formaldehyde being liberated and an insoluble product precipitated. It is intended both for internal and external use; internally as an antiferment and diuretic; externally for the treatment of skin diseases.

Galloformin is a product of gallic acid and hexamethylenetetramine. It forms hard, strongly-refractive needles, which are difficultly soluble in cold water, alcohol, ether and glycerin, and insoluble in chloroform and in olive oil. Its solutions are decomposed on heating. It is used both internally and externally.

Naphthoformin, is produced from both α and β naphthol under the same conditions as "insoluble" polyformin, and has the same properties as that body.—Apoth. Ztg., July 16, 1898, 497.

Formaldehyde—Use as a Preservative for Cider.—Some experiments having been carried on last year by E. H. Bailey and C. W. Rankin in the

laboratory of the University of Kansas upon salicylic acid and calcium sulphite as preservatives of cider (see Proceedings, 1898, 992), the authors have since applied the same method of testing to the use of formaldehyde, with results which they summarize as follows:

1. A solution of 1 to 606 absolutely prevents the formation of alcohol.

2. When 1 to 1212 is used, very little alcohol is formed for about two weeks; then gradually some alcohol is formed, but the amount is greatly limited.

3. With 1 to 3030 there is about the same retarding of fermentation.

4. The effect of the formalin is very noticeable in both the second and first solutions, so that in no case is there one-half as much alcohol formed as under normal conditions.

5. As would be expected, only a small quantity of acetic acid is formed, and the quantity under normal conditions is very near that which is formed by the oxidation of the largest percentage of alcohol. In the warmed sample there is probably a loss of acetic acid from evaporation.

Comparing this preservative with salicylic acid under the same conditions, it seems to be evident that a smaller quantity of formaldehyde will produce given results. It is, furthermore, evident that a still smaller quantity of the preservative will delay the process of fermentation, and experiments will be made to determine the minimum amount that will produce the retarding effect on normal cider.—Bull. Pharm., Sept., 1898, 394.

Glycoformal—Composition.—According to Dr. A. Schlossmann, the composition of glycoformal is as follows: Formaldehyde, 30 p.; water, 60 p.; glycerin, 10 p. Using the official (40 per cent.—Ph. G.) formaldehyde solution, the formula would be as follows: Formaldehyde solution, 75 p.; water, 15 p.; glycerin, 10 p.—Pharm. Centralh., Dec. 29, 1898, 942.

Isobutyl Alcohol—Use as an Alkaloidal Solvent in Forensic Analysis.—Nagelvoort recommends isobutyl alcohol as a substitute for the unpleasantly odorous amyl alcohol as a solvent for alkaloids in forensic cases, in which the latter has hitherto been used according to the method of Stas-Otto. In the case of morphine it is well to add the isobutyl alcohol before rendering the solution to be extracted alkaline. — Pharm. Ztg., Nov. 5, 1897, 791; from Tijdschr. v. Pharm., 1898, 316.

Cognac Oil—Characters of the Oil Distilled from Wine Yeast.—Messrs. Schimmel & Co. (Report, April, 1899), have distilled cognac oil from wine yeast obtained from the vineyards of the Rhine district, as well as Lausatia, and obtained results which are presented in the following table, together with constants observed with German, with Spanish, and with synthetic cognac oil.

Origin.	Sp. Gr at 15° C.	Opt. Rot. at 20°.	Acid Number.	Ester Number.	Solubility.
Rhine. Raw oil from wine yeast	0.878	—0°3′	55 2	207.3	2 vols. 80 p. c. alcohol.
The same, rectified	0.879	—0°4′	50.9	218.6	"
Lausatia. Raw oil from wine yeast	0.880	—0°10′	70.9	210.8	"
The same rectified	0.880	—0° 11′	68.6	140.9	"
Spanish	0.876		37.1	212.4	Insoluble in 80 p c. alcohol. Soluble in ½ vol. 90 p. c. alcohol.
Commercial	0.883	+0°43′	105.5	172.8	Soluble in 2 vol. 80 p. c. alcohol.
Synthetic	0 871	+0°	5.8	291.7	Soluble in 10 vol. 70 p. c. alcohol.

While the data so far obtained were as yet insufficient to advance a definite standard for the purity of cognac oil, so much seems certain, that a very low specific gravity and a high ester percentage indicate the presence of artificial cognac oil.

Amylic Alcohol— New Products by the Action of Metallic Sodium. — According to Guerbet a new alcohol, $C_{10}H_{22}O$, and a new acid, $C_{10}H_{20}O_2$, are formed, along with isovalerianic acid, and the isovalerianic ester of the new alcohol, when amylic alcohol is boiled with metallic sodium, and the heating continued during twenty-four hours under a reflux condenser. The formation of the alcohol is due to the action of the sodium amylate on amylic alcohol, and the oxidation of the new alcohol results in the formation of the new acid. The new alcohol boils under ordinary pressure at 210°–211° C.; the new acid, under 46 Mm. pressure, at 164°–165°C.—Pharm. Journ., April 15, 1899, 335; from Compt. rend., cxxviii., 511.

Amyl Nitrite — Modification with Carbonic Oxide. — Dr. F. Winkler recommends for inhalation amyl nitrite which has been saturated with carbonic oxide. Amyl nitrite carbonated in this way may be inhaled without producing the untoward symptoms, such as headache, etc., usually experienced when pure amyl nitrite is inhaled.—Ztschr. f. Klin. Med., *36*, 1 and 2; Pharm. Centralh., Jan. 5, 1899, 5.

Amylenchloral—A New Alcoholate.—Under conditions which are not given, chloral and amylen hydrate are caused to unite so as to form an alcoholate—dimethylethylcarbinolchloral—which has been introduced by a German manufacturing firm under the name of "amylenchloral." The compound is a colorless, oily fluid of sp. gr. 1.24, having a peculiar camphor-like odor and a cooling pungent taste. It is insoluble in cold water, but by prolonged boiling dissolves with decomposition. In alcohol, ether, acetones, fixed oils, etc., it is miscible in all proportions. Drs. Fuchs and Koch regard it as being a reliable and innocuous hypnotic.—Pharm. Ztg., Sept. 17, 1898, 667.

Amylenchloral—A New Hypnotic.—Dr. Meltzer speaks favorably of amylenchloral as a substitute for chloral hydrate. It has been introduced into medicine under the name of

Dormiol. Dr. Meltzer observes that it shows peculiar solubilities in

water. When first mixed with an equal volume of water an emulsion is formed, which after several days clears up, and eventually a clear solution is formed: but on addition of much water, dormiol again separates out. It may be given, emulsionized with gum arabic, in doses of 0.5 to 3.0 Gm.; or it may be given dissolved in oil or in gelatin capsules.—Pharm. Centralh., May 11, 1899, 296.

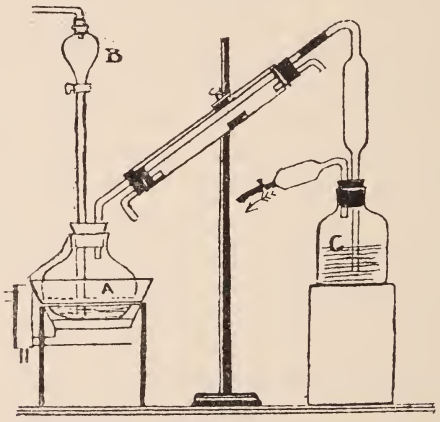
Glycocol—Simplified Method of Preparation.—Glycocol is generally prepared by Kraut's method, which consists in reacting on monochloracetic acid with a large excess of ammonia, and purifying the product by means of a cupric salt. V. Auger has found it much simpler to react with an alkaline monochloracetate on hexamethyleneamine, molecule for molecule; in such a case it is not necessary to work with dry products. For example, 95 Gms. of monochloracetic acid is dissolved in 100 Gms. of water, and saturated with a concentrated solution of potassium carbonate; at the same time add to a solution of commercial formic aldehyde a slight excess of ammonia, and boil to drive off the ammonia. The hexamethyleneamine formed is estimated by evaporating an aliquot part to dryness; mix the two solutions so as to add $1\frac{1}{10}$ molecule of hexamethyleneamine. The temperature rises to about 60°. Evaporate to dryness on a water-bath *in vacuo* for preference. The residue, $(CH_2)_6N_4ClC_2H_2O_2K$, is roughly powdered, and 600 Gms. of alcohol at 95° added, and decomposed by the passage of a current of hydrochloric acid gas; formol, chlorides of ammonium and potassium, chlorhydrate of glycocollate of ethyl, and water are formed. The formol is removed by decantation, and the residue washed carefully with alcohol. After distillation, a viscous residue is left; this is diluted with water and boiled with an excess of calcium carbonate and moist oxide of copper. Glycocollate of copper is formed, which is purified and then decomposed by hydrogen sulphide. Chem. News, May 12, 1899, 228; from Bull. Soc. Chim., xxi.-xxii., No. 1.

Crystalline Glycollic Aldehyde—Conditions of Formation.—Henry J. Horstman Fenton and Henry Jackson have previously shown that dihydroxymaleic acid, when heated with water, breaks up almost quantitatively into glycollic aldehyde—$C_2H_4O_2$—and carbon dioxide. By suitable treatment they have obtained it in the form of a syrup, which, as since found by them, polymerizes when heated to 100° in a vacuum, to a large extent, yielding a hexose—$C_6H_{12}O_6$. During the operation, a small quantity of crystalline substance was often observed in the exit tube of the apparatus employed, and by taking certain precautions, they have now obtained some of these crystals in sufficient quantity for examination. It proves to be pure glycollic aldehyde, and though at first it was believed to be bi-molecular and to have the double formula, $C_4H_8O_4$, they eventually obtained figures by the cryoscopic method which show the molecular formula to be $C_2H_4O_2$.—Chem. News, May 19, 1899, 236; from Proc. Chem. Soc., May 4, 1899.

Furfuric Alcohol — Preparation. — Furfuric alcohol, $C_5H_6O_2$, is a substance about which little is known. It is difficult to prepare in large quantities and spontaneously changes after a few hours. G. André has now prepared it by an improved method of that employed by Hugo Schiff, with the view to obtaining it in a state pure enough for determining its heat of formation, to complete the series of thermal relations recently found by MM. Berthelot and Rivals. Furfurol is placed in contact with very slight excess of concentrated aqueous potash solution. The mixture becomes heated and turns into a reddish mass. The furfuric alcohol dissolves in water together with potassium pyromucate and the unattacked furfurol. The aqueous solution is saturated with CO_2, and then the alcohol extracted with ether. The author obtained by this method, after many rectifications, a colorless liquid boiling at 87–89°, and giving on analysis the formula $C_5H_6O_2$.—Chem. News, May 19, 1899, 239; from Compt. rend., cxxviii., No. 17 (April 24, 1899).

Commercial Phenols.—New Method of Analysis.—Dr. S. B. Schryver, of the Wellcome Research Laboratories, after a critical review of the processes in vogue for determining the value of commercial phenols, calls attention to a reaction described by Tilleley in which sodium amide reacts with alcohols, liberating ammonia. The author utilizes this reaction, using the apparatus shown by Fig. 65. About 1 Gm. of finely powdered sodium

Fig. 65.



amide is put into a 200 Cc. flask, *A*, with 50 to 60 Cc. of benzene. The mixture is boiled on a water-bath for ten minutes, a current of dry air free from carbonic-acid gas being passed through it and the funnel *B*, by means of an aspirator or water-pump. The object of boiling is to get rid of the traces of ammonia which adhere to the amide. Into the bottle, *C*, 20 Cc. of normal sulphuric acid is put, and the phenol, dissolved in six times its weight of benzene, is placed in the funnel *B*, and is allowed to slowly

drop into the flask while the boiling proceeds, the current of air passing through as before. The funnel is washed with a little benzene, and boiling and aspiration are continued until the ammonia is wholly absorbed. The amount of standard acid neutralized is then determined in the ordinary way. The method gives good results, and the author gave several hints which ensure practically absolute accuracy, one of the principal points being that the benzene should be free from thiophene. Xylene or toluene may be used instead. He gave results with phenol, cresol, thymol, and guaiacol, showing that the error is generally about 1 per cent. of the amount of the phenol taken, but in a fourth of the estimates the results were identical with the quantities taken. He showed the influence of mixtures upon the method by describing experiments with a mixture of cresol and pure phenol made to simulate commercial carbolic acid. Incidentally he referred to the hydroxyl value of such mixtures, by which is meant the number of Cc. of standard (normal) sulphuric acid required to neutralize the ammonia given off by 1 Gm. of a phenol when treated with excess of sodium amide as described. The hydroxyl value of phenol is 10.63 and of cresol 9.26, and judging from the values obtained the process gives only a rough approximation of the relative proportions of mixtures like cresol and phenol. Thus phenol containing 10 per cent. of cresol gave 10.49, with 20 per cent. 10.35, with 40 per cent. 10.08, with 60 per cent. 9.76, and pure cresol 9.26.—Chem. and Drug., June 10, 1899, 918.

Phenols—New Mercurial Compounds.—Cautrelet gives some information concerning some new mercuric compounds produced under certain conditions from phenols, such as carbolic, cresylic or thymic acid. These preparations depend upon the fact that the nitrated derivatives of paraphenolsulphonic acid readily unite with mercury, forming compounds, which, according to the phenol used, are designated by the author as *Phenegol*, *Cresegol*, or *Thymegol*, and in their composition may be considered as mercuro-potassium salts of the nitroparaphenolsulphonic acid. The carbonic acid compound,

Phenegol, is a red-brown powder, odorless, tasteless, soluble in cold water in all proportions, and devoid of acid or corrosive action. It does not precipitate albumen, but precipitates toxins, and is regarded a powerful bactericide and antiseptic, which is of particular advantage, by reason of its non-corrosive action, for sterilizing surgical instruments. Experiments upon animals show that it is borne well when injected subcutaneously.—Apoth. Ztg., May 6, 1899, 251 ; from La Presse Med., 1899, No. 34.

Crude Carbolic Acid—Approximate Determination of the Relative Proportions of Phenols.— Carl E. Smith, after discussing the difficulties encountered in the attempt to accomplish an accurate valuation of crude carbolic acid, and particularly to determine the relative proportions in which the phenolic constituents—phenol and the cresols—are present,

recommends a method of assay by which these proportions may, approximately at least, be ascertained. The official requirement at present places no restriction on the proportion of phenol and the cresols, but merely the absence of more than 10 per cent of the "less soluble constituents of coal tar." It may be assumed, therefore, that a standard of not less than 90 per cent. of the phenols was intended; but the possible presence of large quantities of water was evidently lost sight of; as this may be legitimately present up to 5 per cent., it would seem that a sample assaying 85 per cent. of phenols would meet the official requirement. The process of assay recommended by the author is carried out as follows: Place 1 Gm. of the sample into a graduated 100 Cc. flask, nearly fill with water and shake briskly for a few minutes. Then fill to the mark with water and mix thoroughly. Measure 2 Cc. of this solution into a glass-stoppered 100 Cc. flask (excluding undissolved matter, by filtration, if necessary), add 10 Cc. of water, 12 Cc. of decinormal bromine solution, and 2 Cc. of hydrochloric acid. Stopper at once securely, and shake the mixture occasionally during a half hour. Then add 2 Cc. of potassium iodide test solution in such a manner as to avoid the loss of bromine vapor, and quickly reinstate the stopper. Shake thoroughly and add decinormal thiosulphate solution until the solution is decolorized. If the sample contains cresols in considerable quantity, the solution will become yellow again after standing a short time, probably due to the gradual breaking up of an addition-product of tribromcresol and bromine or iodine. This may be hastened by active shaking after each addition of thiosulphate to the decolorizing point, and must be continued until the solution remains colorless after prolonged shaking. The number of cubic centimeters of thiosulphate required, deducted from 12, gives the number of decinormal bromine solution consumed by 0.02 Gm. of the sample.

The author has found by experiment that if the sample contains 85 per cent. chiefly phenol, 11.0 Cc. of decinormal bromine solution will be consumed by 2 Cc. of a solution containing 0.02 Gm. of the sample. Proportionately less, however, will be required if the 85 per cent. of phenol is a mixture of phenol and cresols, or chiefly cresols, the following figures having been ascertained:

Phenol,	3/4;	cresol,	1/4,	requires	10.65 Cc.
"	1/2;	"	1/2	"	10.30 Cc.
"	1/4;	"	3/4	"	9.95 Cc.
Chiefly cresols				"	9.60 Cc.

The approximate determination of the proportions of phenol and cresols becomes possible by observing the character of the precipitate produced by bromine in the sample and comparing it with the precipitates produced by bromine upon known mixtures of pure phenol and cresols. Thus, tribromphenol separates in the assay as a very voluminous, white, flocculent precipitate, leaving the solution perfectly clear. The tribrom-cresols

separate imperfectly, a large proportion remaining suspended, forming a liquid of milky appearance, while a portion of the precipitate settles to the bottom in form of small brownish-yellow globules, which occupy very little space as compared to the phenol. The relative proportions having then been determined by comparison with standard phenol-cresol mixture, it is easy to arrive at a conclusion as to the absolute phenol content of the sample. Supposing that the appearance of the precipitate indicates phenol and cresol to be present in about equal quantities, and that 10.7 Cc. of decinormal solution is required. According to the table, an 85 per cent. acid, containing phenol and cresols in equal proportion, would have required 10.3 Cc., so that a simple calculation is made as follows: 10.3 : 10.7 : :85 : x ; x = 88 per cent., the amount of mixed phenols present in the sample. This assay, when properly carried out, in the opinion of the author, fills all necessary conditions, and obviates the necessity of applying the pharmacopœial test of solubility, for alkali, etc., which can give no additional information concerning the value of "crude carbolic acid."—Amer. Journ. Pharm., Aug., 1898, 369–378.

Guaiacol and Creosote—Distinctive Reaction with Formaldehyde.—Prof. Diosc. Vitali has observed that if a drop of very dilute formaldehyde solution (1 per cent.) is mixed with a drop of aqueous solution of guaiacol in a porcelain capsule, and then about 1 Cc. of concentrated sulphuric acid is added, drop by drop, a beautiful violet coloration is observed on the bottom of the capsule as soon as the acid comes in contact with the liquid, and gradually pervades the entire fluid. Creosote, when treated in the same way, also produces a violet color, but this has a decided tinge of carmine red, and on the continued addition of the acid a turbid fluid is produced, from which carmine red flakes separate after a short time. In the case of guaiacol, the fluid remains clear and there is no flocculent separation. Pure guaiacol by itself in solution, forms a green liquid with concentrated sulphuric acid. If, in the case of creosote, acetaldehyde is substituted for formaldehyde in the above reaction, a pure carmine-red coloration results.—Apoth. Ztg., July 9, 1898, 481.

Potassium Guaiacol-Sulphonate—Character and Uses.—According to "Wiener Klin. Rundsch." (xii., 550) potassium guaiacol-sulphonate, which has been introduced under the trade name

Thiocol, is regarded one of the best preparations for employment in phthisis and similar diseases which require the creosote or guaiacol treatment. It contains about 60 per cent. of guaiacol, aud occurs in white crystals, which are very soluble in water, and have a bitter taste, with sweetish after-taste. Being without irritating action on mucous membranes, it may be given in large doses without the least ill effect or causing any discomfort to the patient. As much as 10 or 15 Gm. may be given in twenty-four hours, in solution flavored with any desired adjuvant.—Pharm. Journ., Jan. 14, 1899, 28.

Creosote—A Remedy in Chronic Constipation.—Dr. Vladimir has found creosote to be a valuable remedy in chronic constipation, its use being unaccompanied by any pain or discomfort. He commences with doses of single drops increased to 7 or 8 drops in a glass of milk or beer after lunch and dinner. It appears to act by neutralizing an intestinal toxin which causes the malady by paralyzing the digestive canal.—Pharm. Journ., Nov. 26, 1898, 578, from Bull. Gén, de Thérap., cxxxv., 15.

Creosote-Phosphoric Acid Ester—Composition and Uses.—J. Brissonet has introduced the ester of creosote and phosphoric acid under the name of

Phosot.—It is a colorless, syrupy fluid, having at the most only a faint creosote odor, a specific gravity of 1.25, and is composed of 80 per cent. of creosote and 20 per cent. of phosphoric anhydride. It is recommended as a remedy in pulmonary tuberculosis, in daily doses of 6 Gm., and possesses the advantage of being completely absorbed into the system after passing into the intestines, in which it is split into its components.—Pharm. Centralh., August 18, 1898, 608; from Rep. de Pharm., 1898, 338.

Phosphote—A New Creosote Compound.—J. Brissonet describes a compound obtained by the action of one molecule of phosphorus oxychloride on three molecules of creosote in the presence of an alkali, and has named it "phosphote." To obtain it, 12 parts of commercial sodium hydrate and 37 parts of creosote are mixed with 35 parts of water, and gradually mixed with 153 parts of phosphorus oxychloride. The oily product obtained is washed thoroughly with diluted solution of soda and water, and then dried.—Pharm. Ztg., xliii., 346; from Ztschr. f. Angew. Chem.

Compound Carbonic Esters—Conditions of Formation.—By heating certain neutral phenolic carbonates in various alcoholic media, with certain organic bases, P. Cazeneuve and A. Moul have succeeded in producing many hitherto unobtained double carbonic esters of the aromatic and fatty series. Thus, when phenylcarbonate is treated with urea in the various alcohols of the fatty series, a double carbonic ester of the phenol and the respective alcohol radicles has been obtained. In this manner phenyl-methyl and phenyl-ethyl carbonates, and those of the higher members of the fatty series, have been isolated by the authors; while by substituting other phenolic carbonates, such as those of guaiacol, thymol and cresol, corresponding double carbonates resulted, many of them not previously isolated. The presence of a base is necessary for the reaction.—Pharm. Journ., Aug. 20, 1898, 217; from Comp. rend., cxxvi. and cxxvii., 1871 and 111.

Resorcin—Solubility in Alcohol.—Dr. L. Grünhut finds that 100 Gm. of resorcin requires 62.0 Gm. (=74.31 Cc.) of 90 per cent. alcohol at 15° C., and that the requirement of the Germ. Pharm. that it be soluble in

one-half its weight (0.5 parts) of alcohol is therefore incorrect. In the case of water-solubility the same authority gives it as 1 : 1, whereas 100 Gm. of resorcin are soluble, according to L. Caldron, in 67.89 Gm. of water at 12.5°C., and 43.74 Gm. at 30° C. It is not clear, therefore, why in the case of the alcohol-solubility the requirement is not also given in round numbers, approximating to the absolute number, as appears to be done in the water-solubility of resorcin.—Pharm. Centralh., 1899, 399.

Resorcin Monacetate — Character and Remedial Value. — Resorcin monacetate, which occurs in the form of a thick paste or honey-like substance, has been introduced into medicine, under the name of

Euresol, as being available for all the purposes to which resorcin is applied, and as being specially useful, owing to its honey-like consistence, for application to those parts of the skin that are covered with hair. For this purpose it is advantageously dissolved in acetone.—Pharm. Journ., June 21, 1899, 54; from Rev. Med. Pharm., v., 292.

Acid Glycerophosphates—Preparation and Reactions.—In continuation of their studies on the glycerophosphates, Adrian and Trillat find that when a little dilute sulphuric acid is added to barium glycerophosphate, barium sulphate is formed, while the liquid remains neutral to helianthine; the precipitate continues to form until there is just an excess of acid. This reaction does not give free phosphoglyceric acid, but an acid salt; if this salt is treated with a soluble sulphate a double decomposition takes place. These two reactions show that it is possible to obtain acid glycerophosphates by two methods: (1) By the decomposition of a neutral glycerophosphate by sulphuric acid, and (2) by double decomposition between an acid glycerophosphate and a soluble sulphate. The preparation of the acid salts of barium, zinc, and magnesium are then described, and the results of their analyses given. When an acid glycerophosphate is dried at 130° it appears to be anhydrous, but when powdered it is extremely hygrometric. The principal difference between these last and the neutral salts is their great solubility in cold water, as well as in water to which alcohol has been added. They are not sensibly decomposed by heat; they are distinguished from the neutral and acid phosphates by the same reactions as the neutral glycerophosphates; acetate of lead gives a white precipitate soluble in acetic acid; but neither ammonium molybdate, uranium acetate, silver nitrate, or ferric chloride, give any precipitate at all.—Chem. News, Nov. 18, 1899, 255; from Journ. de Pharm., vii. (1898), No. 11.

Glycero-Phosphate of Calcium.—Composition and Estimation.—By the analysis of calcium glycerophosphate, Adrian and Trillat obtained: Phosphoric acid, 32.93 per cent.; calcium, 26 per cent. A very rapid method of estimating this and other glycerophosphates is obtained by adding sulphuric acid of known strength to a cold solution of a neutral glycerophos-

phate, using helianthine as indicator. The change appears the moment half a molecule of acid for one molecule of the neutral salt has been added.—Chem. News, July 29, 1898, 60; from Bull. Soc. Chim. (3), xx., No. 7.

Organic Glycerophosphates — Preparation. — In continuation of their studies, Adrian and Trillat have determined the following method for preparing the glycerophosphates of different organic bases, such as cocaine, quinine, phenylhydrazine, etc.: A solution of neutral glycerophosphate of calcium is treated with dilute sulphuric acid until it is just acid to helianthine, and is then brought back to neutrality with a few drops of neutral glycerophosphate; heat and filter off the calcic sulphate thus precipitated. After having added the base until the reaction is alkaline, and then a great excess of alcohol, the whole must be again heated for a few minutes, and filtered with a filter-pump to separate the precipitated glycerophosphate of calcium; the solution must be concentrated at as low a temperature as possible, and desiccated *in vacuo* over sulphuric acid; the residue is taken up with a little water, and shaken up several times with ether, to remove all excess of the base; the aqueous solution is again evaporated down, and the residue triturated with strong alcohol. The unprecipitated phosphoglycerate of calcium remains in suspension; the residue, soluble in alcohol, is finally dried at 50° to 60°. The strong bases only (quinine and cocaine), seem able to completely displace the lime of the acid phosphoglycerate. The less strong bases (aniline, phenyl-hydrazine, pyridine, etc.), precipitate a certain amount of the neutral phosphoglycerate of calcium, but the residue from the filtrate contains a considerable proportion of a body either insoluble or only slightly soluble in alcohol.—Chem. News, Jan. 20, 1899, 35; from Journ. de Pharm. (1899), viii., No. 4.

FIXED OILS.

Fixed Oils—Improved Method of Iodine Absorption Test.—Following up the conclusions arrived at in the study of Hübl's Solution that hypoiodous acid is the substance chiefly concerned in the addition of iodine to fixed oils, J. J. A. Wijs suggests a process by which hypoiodous acid is more directly employed. This is not at first hand, but by using a solution of iodine monochloride in 95 per cent. acetic acid. To obtain the reagent 13 Gm. of iodine are dissolved in a liter of the acid. The halogen content is then determined, and chlorine, free from HCl, is passed in until the halogen content is doubled. This reagent is then used exactly the same as Hübl's Solution. It has the advantage of greater celerity. Thus in the case of oils of high iodine values the absorption was complete in less than ten minutes, and oils of low iodine values required no longer than three to four minutes.—Pharm. Journ., Oct. 15, 1898, 417; from Berichte, xxi., 750.

Fats—Determination of Ash.—The following simple method for burn-

ing off fats, previous to incineration, in the analytical determination of the ash, is proposed by A. Delecoeuillerie: The weighed quantity of the sample is melted in the platinum dish, and then a small ash-free filter paper folded in four is stood in the melted fat and lighted; this serves as a wick, and the fat is quickly and completely burnt off.—Pharm. Journ., Aug. 20, 1898, 217; from Rev. Pharm. de Flanders, v., 65.

Lichesteric Acid—Characters.—H. Linnhold has subjected lichesteric acid, the characteristic fatty acid of Iceland Moss (*Cetraria Islandica*), to comprehensive study and examination. After describing the method of preparing the pure acid, its characters are given as follows: When perfectly pure lichesteric acid melts at 124.5 to 125° and congeals again to form a crystalline mass at 120–122°. It is insoluble in water, easily soluble in ethyl- and methyl-alcohol, in hot glacial acetic acid, hot benzol, in carbon disulphide, and in chloroform, but less soluble in petrolenm ether, in acetone and in hot diluted alcohol. From the latter solution it crystallizes in pearly-glistening, partly square and partly rhombic plates. The result of the elementary analysis agrees better with the formula given by Schnedermann and Knop in 1845, $C_{29}H_{25}O_5$ (old notation) than with the formula $C_{14}H_{24}O_3$ subsequently given by Strecker, but agrees best with the formula $C_{19}H_{32}O_4$, which the author is inclined to accept as correct. The salts of potassium, ammonium, silver, copper, calcium and barium are described, and the analytical figures obtained agree very closely with the formula accepted by the author. By heating lichesteric acid with 10 per cent. solution of potassium hydrate, it is split up with the formation of a new acid, which the author names

Lichesterylic Acid. This is obtainable in broad, rhombic tables or slender prisms, according to the solvent employed, and is easily soluble in methyl- and ethyl-alcohol, ether, acetone, benzol, chloroform and warm glacial acetic acid, less soluble in petroleum ether, and insoluble in water. The elementary analsyis leads to the formula $C_{18}H_{34}O_3$.—Arch. d. Pharm., (1898), *236*, No. 7, 504–522.

Cotton Seed Oil—Comparative Value of Different Reagents.—Kiamil Mazar, from comparative experiments made on over 300 samples of oils, comes to the conclusion that nitric acid (10 Cc. of nitric acid, sp. gr. 1.40, free from nitrogen, to 5 Cc. of oil) is an uncertain reagent for cotton seed oil. Hirschsohn's reagent (10 drops of a 0.5 per cent. solution of auric chloride to 5 Cc. of oil), is not sensitive. Bechi's reagent (5 Cc. of oil, 25 Cc. of absolute alcohol, and 5 Cc. of a 10 per cent. solution of silver nitrate in absolute alcohol) gives doubtful results. He only finds Halphen's reagent satisfactory. This consists in using equal parts of oil, of amylic alcohol, and of a saturated solution of sulphur in carbon disulphide.—Chem. News, Febr. 10, 1899, 72; from Journ. de Pharm. (1899), viii., No. 5.

Pumpkin Oil—Physical and Analytical Constants.—H. Poda has deter-

mined the following physical and chemical constants for pumpkin oil, which is used to some extent in Austria and Hungary as food: Its sp. gr. is from .923 to .925; iodine number (H) 122.76–130.68; saponification number, 188.36–190.17; index of refraction at 25° C.—70.0 to 72.5; melting point of the fatty acids begins at 26.5–28.5, ends at 28.4–29.8, The oil does not react with either Bechi's or Baudonin's test.—Apoth. Ztg., Oct. 1, 1898, 696; from Ztschr. f. Unters. d. Nahr. u. Genussmittel, 1898, 625.

Croton Oil—Properties When Obtained by Different Methods.—Javillier finds that croton oil prepared by simple pressure, by lixiviation with ether at 0.758, or by double digestion at 75° in alcohol at 95° has different appearances, and gives different results on analysis, and also different returns; the first gave 12.5 per cent., the second 38 per cent., and the third 12 per cent. If one volume of the first oil be heated with two volumes of absolute alcohol, there is complete solution at 75°, but on cooling 0.8 per cent. in volume of the oil separates; the second oil acts in the same manner, while the third is entirely soluble even in the cold. The first two oils congeal at —7° and the third at —8°, but they all commence to thicken before reaching zero. The index of iodine absorbed by these oils for 100 Cc. of each is—No. 1 = 109, No. 2 = 108, No. 3 = 91.2. Commercial oil generally has an index equal to 102. The index of saponification was found to be—No. 1 = 192.9, No. 2 = 194.5, No. 3 = 260.6, and commercial oil 205.6. The index of acidity was—No. 1 = 27.3, No. 2 = 30.9, No. 3 = 60.1. To sum up, it appears that the oil extracted by alcohol (No. 3) differs considerably from the other two, which are almost identical.—Chem. News, Nov. 18, 1898, 255; from Journ. de Pharm. (1898) vii., No. 11.

Fixed Oil of Aspidium Filix Mas—Characters, etc.—During an examination of the active constituents of the extract (oleo-resin) of male fern, Julius Katz obtained among the final residues a considerable quantity of a dark-green colored thick fluid fixed oil, which congealed during the low winter temperature. He subjected this oil to chemical examination, by which he determined it to be composed of the glycerides of oleic, palmitic and cerolinic acids—principally oleic acid—the last two amounting only to about 4.5 per cent. of the whole. Phytosterins could not be found in the oil. Owing to its deep-green color, the saponification number of this oil could not be determined. The iodine number (Hübl) was 85.4.—Arch. d Pharm., 1898, 236, No. 9, 655–662.

Seal-fat—Character of Fatty Acid.—Ljubarsky describes the fat of the Caspian seal as being a reddish fluid having an unpleasant train-oil-like odor. It is easily saponified by alcoholic potash solution, the fatty acids of the soap produced consisting to the amount of 17 per cent. of palmitic acid, the remaining 83 per cent. being oleic acid ($C_{18}H_{34}O_2$), and physetoleic acid ($C_{16}H_{30}O_2$); volatile fatty acids are not present.—Apoth. Ztg., July 16, 1898, 499; from Journ. prakt. Chem., 1898, *57*, 19.

Turtle Oil—Preparation from the Livers, Characters, etc.— According to Oliviéro the natives of the Seychelles prepare an oil from the livers of *chelonia midas*, one of the largest species of turtles, which attain a weight of 500 kilos. The livers weigh from 15 to 21 kilos, and yield from 8 to 9 kilos of oil by a cold process similar to that practiced in the preparation of cod liver oil, to which it bears some resemblance in odor. It is of a straw-yellow color, thick-liquid, and deposits an abundance of margarin at a temperature of 15° C. It is characterized by a low sp. gr., viz., 0.905, cod liver oil having a sp. gr. of 0.930, while most of the vegetable oils have sp. gravities ranging from 0.915 to 0.935. The oil is sparingly soluble in 95 per cent. alcohol, readily in ether and in benzin, congeals to a butter-like mass at + 6° C., is non-drying, and does not readily become rancid. It may be distinguished from cod-liver oil by certain color reactions with acid. Sulphuric acid produces a brown color, nitric acid a brownish color, and Caillet's reagent (nitric, sulphuric and phosphoric acid) is without reaction. With the same reagents in the order named, cod-liver oil produces a violet, a rose-red and a red color.—Apoth. Zeit., July 6, 1898; from Bull. Commercial, xxvi., 1898.

CARBOHYDRATES.

Carbohydrates—Absorption by Plants.—According to Jules Laurent, plants are not only capable of absorbing carbohydrates by their roots, but of converting them—under the influence of sunlight—into reserve material, so that carbon may be assimilated thus, as well as by the action of chlorophyll. The process, in the case of plants which are devoid of chlorophyll, is only an instance of what takes place in plants in general. It was found that when the roots of plants which had been deprived of their starch were plunged into a solution of glucose, the experiment being conducted in an atmosphere deprived of carbon dioxide and exposed to sunshine, starch was detected in the leaves in a few hours, while in a parallel experiment, when pure water alone was employed, no starch was formed.—Pharm. Journ., Dec. 24, 1898, 665; from Compt. rend., cxxvii., 786.

Cellulose—Solvent Power of Certain Enzymes.—F. C. Newcomb has made a series of experiments in order to ascertain the solvent power of certain enzymes on cellulose. For this purpose he prepared extracts of the fungus *aspergillus oryzæ* (commercially known as "taka-diastase") and of the seedlings *lupinus albus* and of *phoenix dactylifera*. An extract of barley malt was also made for the purposes of comparison. It was found that the enzyme of *aspergillus oryzæ* attacks reserve cellulose with greater intensity than it attacks starch, the difference being even more marked in the case of the extracts of the cotyledons of seedlings of *lupinus albus* and of *phœnix dactylifera*, though the latter differ slighuly among themselves. The two last-named enzymes act on starch so feebly and

on reserve cellulose so strongly, that they are to be regarded as "cytase" rather than as "diastase." The very dilute enzyme of *hordeum vulgare* likewise attacks reserve cellulose, and having this property in common with the enzymes of the other plants mentioned, an enzyme solution need not be very strong to act on cell walls. None of the five enzyme-extracts employed shows itself more suited, however, than the others for the solution of any one kind of reserve cellulose experimented on.—Pharm. Jour., March 25, 1899, 275; from Annals of Botany, *13*, 49.

Celluloid—Non-Inflammable Variety.—A celluloid that is claimed to be non-inflammable is manufactured under a patent secured by Béthisy, in France. The process of manufacture is the same as usual so far as the manufacture of nitrocellulose, but 10 to 15 per cent. of dried egg or blood albumen is then added, together with 10 to 15 per cent. of powdered mica to obtain the transparent kind, or 10 to 15 per cent. of alum and asbestos in powder for the opaque kind. The mass is then incorporated with vaselin oil dissolved in acetic ether, and afterwards solutions of zinc chloride and white gelatin are added, and the mass allowed to stand for some hours before pressing it into blocks.—Pharm. Journ., Jan. 28, 1899, 75; Brit. Jour. Photog., *46*, 4.

Hadromin—A Newly Discovered Component of the Wood Substance of Plants.—The lignification of membranes is easily recognized microscopically and macro-chemically by certain color reactions, among which that most popularly in use is that of Wiesner, depending on the cherry-red color produced by phloroglucin and hydrochloric acid. It has been contended, however, that this reaction is due to the content in the wood substance of coniferin, vanillin, or related bodies, which give similar colors with phenols and hydrochloric acids, and Prof. Friedrich Cyzapek has therefore undertaken the determination of the body to which this reaction is due. This he has succeeded in isolating. He finds that it is certainly distinct in its reactions from vanillin, but its chemical relations have not yet been accurately determined, though its characters point out that it belongs to the aromatic aldehydes. The new body, being a characteristic component of the hadromes of wood, has been named "hadromin" by the author. It is colored red-violet with sulphuric acid; intense yellow with aniline sulphate and with thalline sulphate; cherry-red with phloroglucin and HCl; blue-green with *a*-naphthol and HCl; green with phenol and HCl.—Apoth. Ztg., Feb. 4, 1899, 65; from "Lotos," 1898, No. 7.

Starch Grains—An Important Study for Food Examinations.—Henry Kraemer delivered an address "on the study of starch grains and its application" before the Pure Food and Drug Congress, Washington, D. C., January, 1899, which is replete with valuable suggestions, and will be consulted with interest and profit by those engaged in the examination of foods and drugs. Professor Kraemer treats his subject in a very clear and terse manner, and in the following sequence: Origin and formation of

starch; kinds of starch; origin of growth of grain; constitution of starch grains; micro-physical examination of starch grains; micro-chemical examination of starch; application of the observations made.—See Amer. Jour. Pharm., April, 1899, 174–189.

Starch—Structure of the Grains.—J. H. Salter observes that the starch grain, in all stages of its growth, is sharply differentiated from the plastid in which it is formed. Its substance is extracted, and is not formed by gradual transformation of successive layers of protoplasm. Staining experiments show that the stratified appearance of starch grains is the result of variations in density—that is, in the capacity of different layers for absorbing water. All growing starch grains appear to have a denser margin, which is not stratified. The lamellæ attain their final differentiation only when they are covered by others formed later. A progressive, but not a uniform, decrease in density may be detected, advancing from the margin to the nucleus of the grain. Observation of starch grains in the process of solution renders it probable that changes may in some cases take place in the surface of the grain from the action of a ferment. As regards the inner structure of starch grains, all the phenomena lead to the conclusion that each lamella, or at least each watery lamella, consists of a series of elements deposited radially.—Pharm. Jour., Dec. 31, 1898, 695; from Pringsheim's Jahrb., xxxii.

Dextrin—Production of a Stable Form from Starch.—Horace T. Brown and J. H. Millar find that when starch is transformed by an active diastase, such as that derived from an air-dried malt, at temperatures below 60°, the reaction proceeds with great rapidity until a resting stage is reached corresponding to $[a]_D$ 150, R 80, for the mixed products of change. At this stage these products consist of maltose, and a dextrin which, comparatively speaking, is very resistant to the further action of the hydrolytic agent. An account is given of the mode of separation, and the dextrin was obtained ultimately with optical and reducing properties corresponding to $[a]_D$ 195–195.7, and R 5.7 to 5.9. This residual reducing power is a property inherent to the dextrin, and is not due to admixture with a second reducing substance. This was shown by oxidizing the dextrin with mercuric oxide and baryta, a definite dextrinic acid being produced.

Dextrinic acid is a complex carboxylic acid with distinct but feeble acid properties. It forms a well-defined calcium salt, containing 0.31 per cent. of calcium, and under the influence of acid hydrolysis yields *d*-glucose and a residual C_5-acid, which is shown to be identical with that obtained by the complete acid hydrolysis of the two maltodextrinic acids already described. The amount of glucose given by this hydrolysis has been determined. Dextrinic acid and its salts, and also the dextrin from which it is derived, unlike maltodextrin and maltodextrinic acid A (which see below), are but very slowly hydrolysed by diastase. After many hours' treatment at 50–60° a certain limited amount of change takes place, the

resulting products being maltose and glucose in about equal proportions. The glucose is not derived from previously formed maltose, since it is observed when a malt-extract absolutely devoid of any maltose-hydrolysing power is employed.—Chem. News, Febr. 17, 1899, 80; from Proc. Chem. Soc., Febr. 2, 1899.

Maltodextrin. — Oxidation Products. — Horace T. Brown and J. H. Millar have studied the characters of the oxidation products of the maltodextrin which occurs among the intermediate products of starch hydrolysis with diastase, and to which the empirical formula — $C_{12}H_{22}O_{11}$ $(C_{12}H_{20}O_{10})_2$— has hitherto been assigned. Although present in considerable quantities in starch transformations which have been arrested at the right point, its preparation in a pure state, and in sufficient amount for extended work, is a very laborious process. When isolated, it was found to have properties corresponding to $[a]_D$ 181—183, and R 42—43, and was completely hydrolysed to maltose by diastase, and to *d*-glucose by acids. When maltodextrin is carefully oxidized with mercuric oxide and barium hydroxide until its power of reducing Fehling's Solution disappears, the greater part of the product is obtained as the barium salt of a definite and complex carboxylic acid, which is provisionally called

Maltodextrinic Acid, A. It has been isolated, and its calcium salt contains 2.4 per cent. of calcium. Maltodextrinic acid, A, is hydrolysed both by diastase and by dilute acids. Under the action of diastase it yields 40 per cent. of maltose, and 6 per cent. of another carboxylic acid of less complexity, viz.,

Maltodextrinic Acid, B, the calcium salt of which contains 3.8 per cent. of calcium. When this is hydrolysed by oxalic acid it yields 67.7 per cent. of *d*-glucose, and another still simpler acid, which is shown to be a C_5-derivative. Maltodextrinic acid, A, when hydrolysed by oxalic acid, yields the same C_5-acid, together with 85.8 per cent. of *d*-glucose. This C_5-acid corresponds in composition to $C_5H_{10}O_6$, and appears to be a normal carboxylic acid derived from a pentose. It is easily obtained in quantities, and its properties will be carfully studied. So far as ascertained, it has many properties in common with xylonic acid. — Chem. News, Feb. 17, 1899, 79; from Proc. Chem. Soc., Feb. 2, 1899.

Inulin—Distribution and Characters.—Dr. H. Fischer finds inulin to be more widely distributed in plants than is generally supposed. It is especially characteristic of the *compositæ*, occurring in most of the tribes, and in a large number of the genera. It was also found in the allied orders, *campanulaceæ*, *lobeliaceæ*, *goodeniaceæ* and *stylidiaceæ;* occasionally in the other orders, but very rarely in monocotyledons. From its osmotic properties the author regards the molecule of inulin as 300 times as large as that of fructose, and 150 times that of saccharose. It gives no reaction with iodine, and the mode of swelling by absorption of water

is quite different from that of starch or gelatin. The sphaerites increase in volume on absorption of water; they dissolve completely like crystals, or break up into granules. Sphaerites of inulin also differ from those of other substances in their deep radial fissures. It must undoubtedly be ranked among the reserve root materials.— Pharm. Journ., May 20, 1899, 451; from Beitr. z. Biol. d. Pflanzen, *8*, 53.

Gum—Detection of Gelatin by Formaldehyde.—A. Trillat takes advantage of the property of formaldehyde to render gelatin insoluble for the detection and estimation of the latter in mixtures containing gum or other bodies not precipitated by formaldehyde. The substance to be tested is dissolved in water, the clear solution evaporated to a syrupy consistence, a little commercial formaldehyde is added, and the evaporation continued to a pasty consistence. The mass is extracted with boiling water by decantation, and the residue dried and weighed.—Pharm. Journ., Nov. 26, 1898, 545; from Compt. rend, cxxvii., 724.

Gentian-Pectin—Hydrolysis.—In continuation of their investigation of the pectous principle of gentian root (which see under "Materia Medica"), E. Bourquelot and H. Hérissey have subjected the pectin to the action of nitric acid—with production of mucic acid—and to hydrolysis by the aid of dilute sulphuric acid—with the production of arabinose. The treatment by nitric acid was applied to the pectin obtained by aqueous digestion at 110°, using 12 Cc. of nitric acid to 1 Gm. of dried pectin; after heating on the water-bath until the volume is reduced to one-third, it is left to stand for twelve hours, to allow the crystals which form towards the end of the operation to collect; these are thrown on a double filter and washed with water, and dried first at 30°, then at 100°. The mucic acid formed melts at 215°. The hydrolysis of the pectin by dilute sulphuric acid is effected by keeping 10 Gm. of pectin, 500 Gm. of water and 15 Gm. of sulphuric acid at 110° for an hour and a half. It is allowed to cool, and filtered; it is then boiled for an hour in a flask fitted with a vertical condenser, neutralized while hot with precipitated chalk, filtered, and evaporated at 60° down to a syrupy consistency. It is then precipitated with alcohol, and the alcoholic liquid evaporated down to the condition of an extract, but no traces of crystals appeared even after twelve days: ether was therefore added to the alcoholic solution, and from the ethereal solution crystals of arabinose were obtained after partial evaporation.—Chem. News, Jan. 6, 1899, 11; from Jour. de. Pharm. (1899), viii., No. 2.

Sugar—Luminosity.—J. Burke describes the luminosity produced by striking lumps of sugar with a hammer. A flash is produced of a somewhat bluish-white color, the light being instantaneous, yet spreading into the sugar far beneath the surface struck. An almost continuous luminosity has been produced by a hammer striking automatically the rim of a rapidly rotating wheel of sugar, obtained by cutting up a sugar-loaf into a

number of discs. The wheels or discs were about an inch thick, so as to stand the violent hammering, and the hammer was of the nature of a pendulum about four feet long, which was drawn aside and then let go.—Pharm. Journ., Oct. 1, 1898, 369.

Cane Sugar—Inversion by Salts.—L. Kahlenberg, D. J. Dain and R. E. Fowler have studied the inversion of cane sugar by salts of aluminum, manganese, zinc, cadmium, nickel, copper, mercury and iron. Both the sulphates and chlorides were used in the majority of cases. The progress of the inversion was followed by means of the polariscope when the solutions were colorless and admitted of its use; in case of the colored solutions, the freezing-point method was employed after it had been demonstrated that this method yields reliable results. Several tests on colorless solutions, in which both the cryoscopic and polariscopic methods were employed, gave practically the same results, showing that the former method can be used with success. In general all the salts of the heavy metals possess the power to invert cane sugar. The chlorides invert faster than the sulphates. When the metals are arranged in a series according o the speed with which their salts of the same acid radical invert sugar, it appears that the order is similar to that of the electro-chemical series. Aluminum is a notable exception. In spite of the high position of this metal in the electro-chemical series, its salts invert sugar more rapidly than those of any other metal thus far tested. Since the pharmacist frequently deals with aqueous solutions containing salts of some of the heavy metals and sugar, as in the case of some of the official syrups and in compounding prescriptions, this article is of interest to him. In all such solutions the sugar present suffers inversion to a greater or less extent according to the age of the solution and the temperature at which it has been kept. The cause of the inversion is the slight amount of free acid that is formed by the action of the water on the salt. It is evident too that in many of our summer beverages that contain both sugar and acid the inversion of the sugar takes place, and increases with the length of time the solution is kept. Again sugar in preserves suffers inversion because of the acid of the fruit. While it is well that these facts be known, no special alarm need be occasioned by them; for although by inversion cane sugar becomes fermentable, yet the digestive juices themselves create fermentable sugar from the starch of foods, and no doubt cane sugar taken into the stomach suffers inversion there to some extent because of the hydrochloric acid present.—Pharm. Rev., April, 1899, 158: from Journ. Amer. Chem. Soc., *20*, 1.

Diabetic Sugar—Identity with d-Glucose.—Le Goff has experimented in order to determine the identity of diabetic sugars, as follows: 4 liters of diabetic urine were filtered, evaporated in the vacuum to a syrup, and allowed to stand in a cool place during 14 days, when it was found to be congealed to a crystalline mass. The crystals were triturated and washed

with cold 90 per cent. alcohol, which removed urea, the coloring matter, extractive, and the greater part of the chlorides present. The washed crystals were then treated with boiling 90 per cent. alcohol and animal charcoal, which dissolved the glucose but left the chlorides and phosphates undissolved. Upon evaporating the filtrate in the vacuum, the glucose was obtained in fine, shining crystals, and after several recrystallizations in a perfectly pure condition, in which after drying they gave figures corresponding with the formula $C_6H_{12}O_6 + H_2O$. Experiments made with the pure substance so obtained have shown conclusively that the glucose of diabetics is identical with *d*-glucose, with which it agrees in melting point, its relation to the yeast ferment and to the reducing action of Fehling's Solution, etc. The osazon from this glucose possesses no characters that distinguish it from the osazon of other glucoses; but the identity with the gluconic acid obtained by the oxidation of *d*-glucose was clearly established in the product obtained by the oxidation of the diabetic glucose under consideration.—Apoth. Ztg., March 15, 1899, 133; from Compt. rend., cxxvii., 817.

Sorbose—Formation by Bacterial Influence.—According to the researches of Gabriel Bertrand on the formation of sorbose, a sugar which was first described by Pelouze, in 1852, it does not exist as such in the juice of mountain-ash berries, but is formed by oxidation from sorbite in the juice, under the influence of a bacterium analogous to or identical with *bacterium xylinum*, Brown. On cultivating this bacterium in a suitable medium containing sorbite, a yield of 80 per cent. of the theoretical yield of sorbose was obtained.—Pharm. Journ., Sept. 3, 1898, 261; from Ann. de l' Inst., Pasteur, xii., 385.

Octite—A New Sugar.—Camille Vincent and J. Mennier have isolated from the mother liquors left on crystallizing sorbite, a new sugar, which they have named octite. It has the composition $C_8H_{18}O_8$, and while not itself crystalline, yields crystalline derivatives. For its isolation, the last traces of sorbite in the mother liquors are converted into sorbose by means of specific bacteria, the solution concentrated, and the new sugar crystallized out as its crystalline dibenzoic acetal, $C_8H_{16}O_8(C_7H_6)_2$. The crystals of this compound deposited from chloroform melt at 230° C., but when simply washed with ether they melt at the low temperature of 140° C. The new sugar, octite, does not reduce Fehling's Solution; it has a specific rotation of— 3°42′ at 20° C.—Chem. News, Dec. 24, 1898, 665; from Compt. rend., cxxvii., 760.

Milk Sugar—Fallacy of Color Test with Sulphuric Acid.—Chas. H. La Wall and Pursel have occasionally found samples of milk sugar which responded well to the polarization test but produced a coloration when sprinkled upon the surface of sulphuric acid, under which test the U. S. Pharm. requires that neither a brownish nor blackish color should develop

within thirty minutes. Conceiving the idea that this might be due to some extraneous substance unavoidably introduced into the milk sugar during the process of manufacture, he examined some crystalline sugar in the well-known aggregations in which it came from the manufacturer, and found that while the outer crystals responded perfectly to the pharmacopœial requirement, the inner crystals, attached to the string on which the crystallization had been effected (as in the case of rock candy), the coloration was developed in direct proportion to the thickness of the crystalline mass—or in other words, to the quantity of thread which had been powdered with the milk sugar.—Proc. Pa. Pharm. Assoc., 1898, 136.

ORGANIC ACIDS.

Oxalic Acid—Modern Industrial Production.—G. F. Zacher describes the industrial production of oxalic acid as follows: Saw dust, or other cellulose substance, is dried and heated in a vacuum to 70° C. to remove air. Hot alkali solution is then added, and the heat continued *in vacuo* to 180° C., the progress of the reaction being controlled by the occasional examination of samples of the mixture. Towards the end of the process, some oxidizing agent — hydrogen peroxide, sodium hyporoxide, air, or oxidized air — is admitted, but the vacuum is maintained. The product, dissolved in water and treated with lime, yields nearly white calcium oxalate. Sulphuric acid liberates from this oxalic acid, which requires only a single recrystallization to render it commercially pure.—Apoth Zeit., July 9, 1898, 482.

Succinic Acid—Estimation in Presence of Tartaric and Lactic Acids.—Bordas, Joulin, and De Raczkowski recommend a method for the estimation of succinic acid in the presence of tartaric and lactic acid, which is based upon the observation that when a concentrated solution of silver nitrate is added to a solution containing the three acids in the form of neutral salts, succinic acid is precipitated completely, tartaric acid partially, and lactic acid not at all. Accordingly, a solution containing the three acids is exactly neutralized with decinormal potash, the number of Cc. required being noted, and an excess of concentrated solution of silver nitrate is then added. The precipitate, collected on a filter, is washed with water until the filtrate no longer affords a precipitate with neutral potassium chromate; the silver tartrate is thus completely washed away, and silver succinate only remains on the filter. The tartaric acid may be estimated by well known methods in the filtrate and washings, and the lactic acid by difference, the total acidity having been ascertained by noting the quantity of decinormal potash as before directed. — Chem. News, July 8, 1898, 18; from Jour. de Pharm. (6), vii., No. 29.

Acetic Acid—Commercial Quality.—Robert T. Berry has examined twelve commercial samples of acetic acid purchased from wholesale and retail dealers as U. S. Pharm. in quality. While all the samples corre-

sponded with the official requirements of color, odor, taste, etc., they all left some residue upon evaporation. None contained poisonous metallic impurities; three were free from HCl, four contained traces of H_2SO_4, and the remainder contained both contaminants, while two responded also to the tests for sulphurous and formic acids. Only one sample exceeded the official limit of empyreumatic substances. They varied very considerably in their acid strength, which was as follows: 36.9, 44.0, 37.2, 44.9, 45.0, 31.5, 44.8, 44.7, 44.8, 40.6, 50.6, and 45.2, the official strength being 36 per cent.—Amer. Journ. Pharm., March, 1899, 142.

Glacial Acetic Acid, B. P., 1898—Correction of Melting Point.—John C. Umney calls attention to an error in the melting point of glacial acetic acid stated in the British Pharmacopœia, 1898, which, although trivial in itself, has given rise to considerable annoyance and trouble in a commercial way. It seems that this acid is admitted into New Zealand at an *ad valorem* duty of 20 per cent., but if the strength falls below that of the British Pharmacopœia it is required that 5d. per lb. duty should be paid upon it, which is practically five times as much as the duty on the acid of proper strength. The method adopted by the New Zealand Customs for determining the strength has hitherto been based upon the liquefying point after crystallization, which, in accordance with the British Pharmacopœia statement, is 15.5° C., and an acid which melted at a lower temperature has been subjected to the payment of the higher impost. Mr. Umney, however, points out that an acid containing 99 per cent. or 98.9 per cent. of real hydrogen acetate, the latter being the amount indicated by the titration in the British Pharmacopœia, will have a melting point of 14.7° to 14.8° C., and that glacial acetic acid having a melting point of 15.5° C. will have a real acid strength of *over* 99 per cent. In support of his statement the author refers to the results of Rêdorff, communicated some years ago, which he has been able to confirm by his own experiments. Incidentally, also, the author refers to the description of the acid in the U. S. Pharm., which requires it to contain 99 per cent. of absolute acid, but states the temperature of crystallization to be *somewhat below* 15° C. and of liquefaction again at *about* 15° C.—Pharm. Journ., Aug. 27, 1898, 242.

Vinegar—Analysis of Commercial Sorts.—Frank G. Ryan communicates some practical observations on the analysis of commercial vinegar, and gives the average results of the analysis of twenty-two samples of pure cider vinegar by A. K. Smith, and the separate results obtained by himself in three samples designated separately as *A*, *B* and *C*, all of which are shown in the following table and may be servicable for comparison in similar examinations:

Vinegar.	Sp. Grav. 15° C.	Acetic acid.	Total solids.	Ash.	No. Cc. $\frac{1}{10}$N acid required to neutralize ash from 100 Gm. vinegar.	Mgm. P_2O_5 in water soluble ash from 100 Gm. vinegar.	Mgm. P_2O_5 in ash not soluble in water from 100 Gm. vinegar.	Total P_2O_5 in ash from 100 Gm. vinegar.	Caramel.
Average of 22 samples pure cider vinegar ..	.....	4.46	2.83	0.39	38.8	19.1	10.1	28.6	
A.....	1.0146	4.06	1.95	0.26	30.0	8.0	12.0	20.0	absent.
B.....	1.015	3.97	2.3	0.087	16.0	3.0	10.0	13.0	present.
C.....	1.016	3.98	2.4	0.032	3.0	trace	5.0	5.0	present.

Sample *A* undoubtedly is cider vinegar, but contains added water, as is shown by the small amount of soluble phosphates present. Sample *B* is a mixture of cider and spirit vinegar, the amount of ash and soluble and insoluble phosphates being very low, while the alkalinity of the ash is also deficient. Sample *C* is spirit vinegar with a little cider vinegar added, probably to give flavor.—Amer. Journ. Pharm., Feb., 1899, 71–73.

Acetone—Detection in Water, Alcohol, and Wood Spirit.—G. Deniger recommends the following method for detecting acetone in aqueous, methylic, or ethylic solutions. For *aqueous* solutions, 2 Cc. must be mixed with 2 Cc. of a mercuric reagent (dissolve 5 Gm. of mercuric oxide in a hot mixture of 20 Cc. of sulphuric acid and 100 Cc. of water); plunge into boiling water; if after ten minutes' boiling there is no cloudiness or precipitate, acetone is not present; if, on the contrary, acetone is present, the amount of precipitate or cloudiness is in proportion to the amount of acetone; the precipitate, however, is never seen in less than forty-five seconds. In the case of *methylic alcohol*, the process is essentially the same, except that the methyl alcohol must be diluted with an equal volume of water, since the undiluted methylic alcohol when heated precipitates the mercuric sulphate. By this process it is possible to detect 3 centigrams per liter of the original liquid tested. In the case of *ethylic alcohol* the dilution must be so great that the liquid shall not contain more than 2 per cent. of alcohol or else the *mercurous sulphate* arising from the reducing action of the alcohol will be precipitated on boiling. Thus a solution of acetone in ethylic alcohol at 90° should be diluted to one-fiftieth, and then treated in the same manner as the aqueous solution.—Chem. News, May 26, 1899, 252; from Journ. de Pharm. et de Chimie, Series 6, vol. ix., No. 1.

Acetone Oils—By-Products in the Preparation of Acetone.—The crude calcium compound of pyroligneous acid always contains, besides calcium acetate as main constituent, small quantities of calcium salts of the highest volatile fatty acids. The crude acetone obtained from this pyrolignite of calcium leaves, on rectification, about 5 per cent. of oil passing over above

70°. This product has been named by A. and P. Buisine oil of acetone, and they have extracted from it acetone, methylethylketone, methylpropylketone, methylbutylketone, and methylisopropylketone. From this mixture

Methylpropylketone, which forms the larger proportion of it, may with advantage be separated as follows: The acetone oil is shaken with an excess of concentrated solution of sodium bi-sulphite. A pasty mass forms, from which the solid and liquid parts separate after standing for some hours, when the liquid may be removed by the aid of a filter pump, and the solid is washed, first with bisulphite solution, then with ether, and dried in the air. The solid bisulphite compound so obtained is decomposed by an excess of hot sodium carbonate solution, the oil which separates is decanted, and dried over potassium carbonate. When distilled, this oil passes over almost entirely between 90° and 110°, and consists of a mixture of methylisopropylketone and methylpropylketone—the latter being by far the larger portion. The two are readily separated by repeated rectification.—Chem. News, April 28, 1899, 262; from Compt. rend., 1899, cxxviii., No. 14.

Acetone Oils—Use for Denaturalizing Alcohol.—Dr. Lang proposes the use of the acetone oils, which are obtainable as a by-product in the manufacture of acetone from crude calcium acetate, from the rectification of raw wood spirit, and—by a process not heretofore published—from the by-products in the rectification of raw alcohol. The latter process has not yet been carried out on an industrial scale, however, and consists in the oxidation of fusel oils by means of a chromic acid mixture, the conversion of the volatile acids formed—acetic, propionic, butyric and valeric—into lime salts, and their dry distillation, which finally yields a mixture of high-boiling ketones. M. Klar reviews Dr. Lang's remarks and opinions on this subject, particularly as regards the probable supply of acetone for the purpose of denaturalizing ethyl alcohol, and comes to the conclusion that the probable supply is insufficient to supply the demands under the British excise law. Acetone oils cannot, therefore, be considered as a substitute for wood spirit, though if an alternative were given, it might be used for denaturalization of spirits in certain cases.—Chem. News, May 5, 1899, 205.

Lactic Acid.—Commercial Quality.—Wm. R. Bready, Jr., examined four samples of lactic acid of different makes. He found them all free from sarcolactic acid, iron and lead. Two of the samples contained the official quantity of absolute lactic acid (75 per cent.), and besides this sugar only; a third sample contained 74.8 per cent. of lactic acid, but contained also traces of chlorides, sulphates and sugar. The fourth sample contained 73.9 per cent. of absolute lactic acid, and as impurities sugar, glycerin and chlorides.—Amer. Journ. Pharm., March, 1899, 143.

Benzoic Acid—Detection of Artificial in Natural Acid.—Dr. P. N. Raikow has experimentally determined that in the technical production of

benzoic acid from toluol, a certain amount of chlorine adheres tenaciously to the product, and that, however small this may be, it may readily be determined as follows: A small quantity of the acid under examination is placed in the loop of platinum wire, ignited, and the product of combustion is caused to act directly upon a mixture of phloroglucim and vanillin. In the presence of chlorine hydrochloric acid is formed by the combustion, and forms an intensely red colored compound with the mixture named. Benzoic acid, which had responded to the pharmacopœial (Germ.) tests of purity for the natural benzoic acid, was found to contain chlorine, and gave the reaction, while benzoic acids prepared by the author from benzoin in several examples did not give this reaction.—Apoth. Ztg., March 8, 1899, 120; from Oest. Chem. Ztg., 1899, 121.

Benzoic Acid—Preparation by Hydrolysis.—The products obtained by the natural as well as the synthetic methods of preparing benzoic acid all have the disadvantage of retaining more or less impurities which render the preparation of an absolutely pure acid extremely tedious. C. Fahlberg has now found that the sulpho-derivatives of benzoic acid, when treated with superheated steam in the presence of an excess of concentrated sulphuric acid, are split up so as to form benzoic acid in a condition in which it is easy to purify it absolutely. Technically this observation is of importance, since it permits of the utilization of numerous by-products that are sulpho-derivatives of benzoic acid.—Chem. Ztg., 1899, 274.

Lithium Benzoate—Commercial Quality and Pharmacopœial Requirements.—Lyman F. Kebler, as a member of Research Committee E, Pharmacopœia Revision, reports the result of his researches upon lithium benzoate. Very little information exists in literature concerning this chemical, the best being that contained in the present United States Pharmacopœia. The author has examined six commercial samples, representing the best goods available in this country, and gives the results in a table, which may be briefly summarized as follows: Three were white powders and three were white scales. Two were amorphous, three amorphous and broken crystals, and one broken crystals only. Three had a benzoin-like odor, one a balsamic empyreumatic odor, two odorless. The percentage of pure lithium benzoate, volumetrically determined, varied in narrow limits between 97.23 and 99. The solutions of three were colorless, the others had a slight tint. The samples were all neutral to litmus and phenolphthalein, but alkaline to cochineal. Their solubilities were as follows: water at 15° C.: in 2.40 to 2.56 parts; boiling water: in 1.9 parts in one sample, in 2 parts in the other samples; alcohol (95 per cent.) at 15° C.: in 18.9 to 19.3 parts: boiling (95 per cent.) alcohol: in 16 to 17 parts.

These observations necessitate several changes in the pharmacopœial description, which states that the salt is soluble in 4 parts water at 15° C., 2.5 boiling water, 12 parts alcohol at 15° C. and 10 parts boiling alcohol.

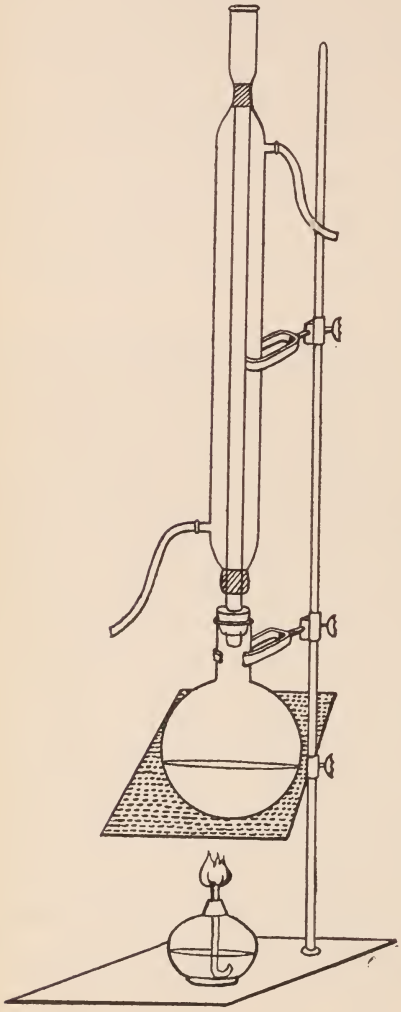
The salt should be characterized, not as slightly acid, as is the general opinion, but as neutral, under the conditions mentioned by the author. The tests for limits of sulphate, chloride, potassium, and other alkalies, also require certain modification, while the method of ignition and subsequent titration for estimating the per cent. of pure salt, as per U. S. Pharm., does not give satisfactory results, and should be carried out in accordance with the following: Weigh about 0.5 Gm. of the dry salt into a platinum capsule, add 2 Gm. of pure, *dry*, ammonium sulphate, mix well with a platinum wire and ignite. Apply the flame gradually at first, so as to avoid any possible spurting. The residue is lithium sulphate, and from this the amount of pure lithium benzoate is readily determined by multiplying the ascertained weight by the factor 2.3256. The method can be easily and quickly applied, and gives concordant results. The author has also examined into the characters of

Lithium Salicylate.—According to a statement of Julliard, who examined a number of samples of lithium salicylate, those samples which produced permanent colorless solutions were either acid in reaction or contained from 15 to 20 per cent. of sodium salicylate. Mr. Kebler examined five samples. None of them contained soda in appreciable quantities; they varied from white to grayish — in one case ashen—colored powders, were all acid in their reaction on litmus, contained from 3.95 to 4.50 per cent. of moisture, and assayed from 98.81 to 100.31 per cent. of lithium salicylate. Slight colors were given with conc. H_2SO_4 in all except the ashen-colored samples, which gave a dark color. The solubilities were as follows: Water at 15°C., in 0.72 to 0.84 parts; boiling water, in 0.44 to 0.49 parts; alcohol (95 per cent.), at 15° C., in 1.63 to 1.81 parts; boiling alcohol (95 per cent.), in 0.91 to 0.93 parts. The salt is deliquescent only in moist air. It may be examined for impurities practically in the same way as sodium benzoate, and under the same restrictions as those noted by the author. The method of ignition to determine the percentage of pure lithium salicylate is also the same as that given under sodium benzoate. One Gm. of dry lithium salicylate yields 0.38224 Gm. of lithium sulphate, or the ascertained weight of the latter may be multiplied by the factor 2.61615. The pharmacopœial requirement of 99.13 per cent. of pure lithium salicylate is not too high, and may be retained.—Pharm. Ztg., 1899, 57–64.

Mercuric Benzoate—Preparation, Properties and Hypodermatic Uses.—Bretonneau and Desesquelle have found that, contrary to the prevailing opinion, mercuric benzoate is insoluble in aqueous potassium chloride or iodide solutions, but that it is easily dissolved in an aqueous solution of ammonium benzoate. For hypodermic injections they recommend: Hydrargyr. benzoas., 0.6; ammon. benzoas., 3.0; aqua dest. ad 60.0 Cc. This solution may be combined, if advisable, with 0.12 cocaine hydrochloride. The authors prepare mercuric benzoate by heating an excess of

alcoholic benzoic acid solution with freshly precipitated mercuric oxide until the latter is completely dissolved. Upon cooling, the mercuric compound is obtained in form of prismatic needles, having the composition corresponding to the formula $(C_6H_5COO)_2$. Hg, and containing 45.22 per cent. Hg. It is sparingly soluble in alcohol or ether, but more soluble in alcohol containing benzoic acid in excess. On boiling its alcoholic solution it is decomposed. While soluble in hot aqueous solution of sodium benzoate, it is largely crystallized out on cooling.—Apoth. Ztg., April 1, 1899, 171; from L'Union Pharm., 1899, 116.

FIG. 66.



Salicylic Acid—Preparation from Oil of Wintergreen.—Leon Laizer Walters believes that natural salicylic acid can be prepared economically by pharmacists, and therefore describes the following simple apparatus (Fig. 66), and process for the purpose: The apparatus required are—a Liebig condenser, a small, round-bottomed flask, several beakers, ten grammes of oil of wintergreen, and four and a half grammes of caustic potash. The flask is fitted with a good cork bored so as to admit the smaller, tapering end of the condensing tube, which is held upright. The whole apparatus is supported by means of a ring-stand as in the case of acetanilid, using a wire gauze or a sand-bath under the flask. The oil is introduced into the flask and the potash, dissolved in a sufficient amount of alcohol, added. The condenser is then replaced, and the flask and contents heated by means of an alcohol or other lamp until all the oil has disappeared, which will require a day or more. The heating, however, requires but little attention beyond occasionally adjusting the flame so that the flask is kept gently boiling. When the reaction is completed the condenser is removed, the contents of the flask dissolved in water and acidified with

hydrochloric acid, when the salicylic acid is precipitated. The acid is filtered off, washed with cold water, and recrystallized from boiling water. If the resulting crystals are discolored, the whole is dissolved in a minimum quantity of boiling water, and a little bone-black added while the solution is being stirred. After boiling for a few minutes the whole is then filtered hot. On cooling, the salicylic acid crystallizes out in fine white needles.—Bull. Pharm., Febr., 1899, 54–55.

Salicylic Acid—Compound with Acetic Acid.—A new ester-like compound of salicylic and acetic acids has recently been introduced under the name of

Aspirin. It has the composition $C_6H_4.OCOCH_3.COOH$, and crystallizes in white needles which melt at 135° C. It is soluble in water at 37° to the amount of 1 per cent., and is soluble also in the usual solvents of organic bodies. It does not give a blue color with ferric chloride solution. Dr. C. Willhauer has used the new substance with advantage in the treatment of muscular rheumatism, etc., in daily doses of 4 to 5 Gm., and the remedy was found to be free from unpleasant after-effects, either upon the heart's action or the functions of the stomach. It is quite possible that the effects of aspirin do not manifest themselves until it reaches the intestinal tract, when it is split up by the alkalinity of the secretions.—Pharm. Centralh., May 11, 1899, 295.

Salicylic Acid—Reaction with Nitrites.—L. van Itallie, having his attention drawn to the action of nitrites on salicylates by the discoloration of an originally colorless mixture of sodium salicylate, spirit of nitrous ether, and water, investigated the reaction, and finds it available for the recognition of salicylic acid in solutions of 1 : 2 or 3000. If some dilute solution of potassium nitrite is added to a 1 per cent. solution of sodium salicylate, a few drops of dilute sulphuric are added, and the mixture is heated to boiling, it becomes yellow, rapidly changing to brown and finally red-brown. On addition of potassium hydrate solution, this changes to dark red-brown, and if the mixture is then boiled with zinc dust, it again becomes colorless. Then, upon adding a few drops of solution of sodium hypochlorite, the liquid becomes handsomely green, and if, in turn, an excess of acid is added to this green solution, it changes to red. —Apoth. Ztg., June 28, 1899, 584.

Bismuth Salicylate—Quantitative Determination of its Constituents.—W. Kollo, referring to the method of Jaillet and Ragonei for preparing bismuth salicylate, and the demand of these authors that the product be washed so long as the washings give a reaction with ferric chloride, observes that bismuth salicylate is slightly soluble in water, and that therefore the washings will continue indefinitely to give the salicylic acid reaction with iron. A better way to determine complete washing is to dry a small portion of the precipitate from time to time, shake it with ether and test the ether solution for salicylic acid; the washings being

continued until the ether no longer takes up any salicylic acid. To determine the composition of bismuth salicylate the author recommends that 2 Gm. be shaken in an Erlenmeyer flask with 30 Cc. water, adding 10 Cc. of normal potassium hydrate, and heating the mixture with frequent stirring on a water-bath to the boiling point. The bismuth hydrate is collected on a filter, washed, dried at 90°–100° C., and weighed; the amount of oxide being calculated according to the equation: $2BiOOH : Bi_2O_3 = BiOOH : x$. The filtrate and washings, containing all the salicylic acid, are diluted to 250 Cc.; of this, 125 Cc. are titrated with normal hydrochloric acid, using phenolpthalein as indicator. The number of Cc. of normal hydrochloric acid subtracted from 5, and the quotient multiplied by 13.8, gives the quantity of salicylic acid contained in 100 Gm. bismuth salicylate.—Pharm. Post, 1899; Apoth. Ztg., March 4, 1899, 113.

Lithium Citrate—Commercial Quality and Pharmacopœial Requirements.—Lyman F. Kebler gives the results of the examination of eight commercial samples of lithium citrate, which seem to prove that there exists considerable variation in the percentage of water of hydration in the salt as supplied, though otherwise pure and free from foreign elements. There seems to be considerable difference of opinion whether the hydrous salt, containing 4 mol. water of crystallization, or the anhydrous salt, is the proper article. The U. S. Pharm. recognizes the anhydrous, while the B. P., 1898, recognizes the hydrous. The latter has been shown to be uniform in composition, while the so-called anhydrous is anything but uniform, and may contain from 1 to 4 mol. of water of crystallization. The author has made experiments which prove that the hydrous salt is non-deliquescent even in an atmosphere saturated with water, while the anhydrous salt, obtained by drying to constant weight at 140° C., is more or less deliquescent, becoming brittle and non-deliquescent after a certain amount of moisture has been absorbed. He finds the hydrous salt to have the solubility within the limits given in the B. P. =twice its weight of cold water, the figures found by him being 1.91 parts of water at 15° C. The anhydrous salt requires 2.434 parts at 15° C. The aqueous solutions are either neutral or slightly acid. The U. S. Pharm. method for estimating the amount of pure lithium citrate has not given satisfactory results, and he recommends a modification which must be consulted in the original. The official method for estimating an excess of the other alkalies is the best at present obtainable.—Amer. Jour. Pharm., March, 1899, 137–141.

Crude Tartarous Material—Precautions in Analyses.—M. J. Schafer observes that among the many methods for the estimation of tartaric acid in tartarous substances, the one most used is that of Goldenberg—a process which is based on the setting free of the tartaric acid by means of hydrochloric. The free acid is transformed into a neutral potassium salt, the liquid evaporated to a small volume, and glacial acetic acid added; this causes a partial precipitation, which becomes complete on adding a known

volume of 96 per cent. alcohol and allowing to stand a certain time. The precipitate of potassium bitartrate, after washing on a filter (with alcohol of corresponding strength [?] Rep.) is eventually dissolved in *warm water*, and the solution thus obtained tritrated *while still warm* with normal soda. In the experience of the author and others, however, a larger proportion of tartaric acid is found than is really present, and this error, though relatively small, is considerably augmented if the original method is not closely followed. The author has studied the conditions at fault, and as the result of his researches comes to the following conclusions :

1. The end of the titration should be decided by the use of pale red litmus-paper.

2. The operation is complete when a drop of the liquid placed on this paper forms a circle bordered with blue.

3. As soon as the glacial acetic acid has completed the precipitation of the tartar, the liquid should be filtered,—if not, another body is formed which saturates a certain quantity of the alkaline liquor, and thus causes too high a result. The quantity of this body formed is in direct proportion with the time the solution is left standing.

4. When the material is exhausted with a mixture of ether and alcohol, before analysis, the whole may be allowed to stand for a much longer time without inconvenience.—Chem. News, Aug. 19, 1898, 85–86 ; from Chemiker Zeitung, 1898, 255.

Tartaric Acid—New Commercial Method of Manufacture.—Dr. G. Scarlata observes that the method of producing tartaric acid commercially at the present time is the very old one of Scheele, which has been modified only to an insignificant extent, and has practically not been improved upon at all. In search for a more economical method, both as to time and utilization of by-products, he has devised one which he believes fills these conditions admirably. This method is based on the decomposition of the tartrates—principally of potassium with some calcium—by fluosilicic acid ; these salts being decomposed with formation of the corresponding fluosilicates and liberation of tartaric acid. Both tartaric acid and calcium fluosilicate remain in solution, while the greater part of the potassium fluosilicate (sol. 1 : 825) is precipitated, and eventually removed by concentrating the acid solution. The calcium salt is removed by the addition of the calculated quantity of sulphuric acid, determined by an assay of an aliquot part of the liquor. It is an easy matter then to obtain the tartaric acid in pure crystals, after having first decolorized the solution by animal charcoal. The details of the fluosilicic acid method being omitted here, it suffices to say that the tartaric acid obtained by it titrated 98.57 per cent. of purity. The principal by-product obtained is potassium fluosilicate, from which, by a process given by the author, (see Fluosilicic Acid), the requisite fluosilicic acid is obtained for the next operation.

The potassium sulphate obtained as a final product, may be mixed with the residues from the other operations, and these constitute an excellent manure.—Chem. News., June 23, 1899, 296; from Mon. Scient., (4), xiii., May, 1899.

Calcium Malate and Calcium Malophosphate—Occurrence in Plants.—Mirande states that malic acid, although it occurs most commonly in the free state in plants, also occurs in combination with calcium as neutral calcium malate, or as calcium malophosphate, the quantity of the latter usually exceeding that of malate. Both compounds are obtained as precipitates by the action of alcohol, the neutral calcium malate, $(C_4H_5O_5)_2Ca$, in the form of sphero-crystals of the ortho-rhombic type, while the calcium malophosphate is obtained in one of two forms, either as sphero-crystalline needles, with excess of phosphoric acid, or as orthorhombic prisms in which malic acid predominates.—Pharm. Journ., July 16, 1898, 50; from Morot's Journ. de Bot., 1898.

Gelsemic Acid—Identity with β-Methyl-Æsculetin.—In the course of some experiments made several years ago with a commercial extract of gelsemium, Prof. E. Schmidt became convinced that gelsemic acid cannot be identified with æsculin, but that in its reactions and properties it bears a close analogy to β-methyl-æsculetin, a body which had previously been separated by him from scopolia root and from other solanaceous plants. He has now again taken up the subject and has obtained results which clearly demonstrate that gelsemic acid and β-methyl-æsculetin, $C_9H_5(CH_3)O_4$, are identical bodies. To prepare it an alcoholic extract of gelsemium was dissolved in water, the solution acidulated with sulphuric acid and repeatedly shaken out with ether. The crystalline residue remaining on evaporating the ethereal solution was crystallized from boiling water and then repeatedly from boiling acetic ether. The pure substance so obtained was in the form of nearly colorless needles, and melted at 202–203° C. (uncorr.), at which temperature β-methyl-æsculetin, after repeated crystallization from acetic ether, also melts. Both bodies show identical reactions. These alcoholic or aqueous solutions show a characteristic blue fluorescence on addition of alkali. Alkaline copper solution and ammoniacal silver solution are reduced by it on heating. Chloride of gold produces a cobalt blue color and is reduced by its solution. Ferric chloride produces a green color in the aqueous solution, potassium permanganate an intensely green color in solutions that are not too dilute, and a light green color in dilute solutions which changes to indigo blue on addition of a few drops of dilute sulphuric acid. Concentrated nitric acid dissolves both preparations with a yellow color which changes to blood red on addition of ammonia. An elementary analysis made proves the identity of gelsemic acid and β-methyl-æsculetin also in their ultimate composition, and that the formula recently given in a paper by Virgil Coblentz (see Proceedings, 1897, 696) is not correct.—Arch. d. Pharm. (1898), *136*, No. 5, 324–328.

Tangic Acid (*"Tangsäure"*)—*A Gummy Substance from Sea Weeds.*—A. Kreptig describes a non-nitrogenous substance which he obtained from sea weeds, which appears to be closely related to the carbohydrates, though its empirical formula, $C_{13}H_{20}O_{14}$, does not indicate this. It is soluble only in media with which it forms chemical compounds, and so in alkalies, with which it forms a viscid substance well adapted for adhesive purposes. It has been prepared especially from the broad-leaved *laminariaceæ*.—Pharm. Journ., July 16, 1898, 50; from Bot. Centralbl., 1893, Beihefte, 519.

Alginoids—A Series of New Remedial Compounds.—E. C. C. Stanford calls attention to the insoluble compounds of alginic acid—$C_{76}H_{80}N_2O_{22}$—as therapeutic agents of possibly great value. The acid is a strong one, displacing carbonic acid in the alkali carbonates and forming soluble salts with the alkalies and with magnesia, while the salts of the alkaline earths and of the other heavy metals, such as iron, zinc, mercury, bismuth, lead, silver, antimony, arsenic, etc., are insoluble and pass unchanged through the stomach. With the exception of the mercury salt, however, these salts are all soluble in ammonia, and may therefore become therapeutically active after passing through the stomach into the alkaline contents of the bowels. While the mercurous compound is not soluble in ammonia, it is decomposed by it, as is evident from the blackening of the originally grey compound. The author proposes the name of "alginoids" for this new class of compounds, all of which are obtained by double decomposition between sodium alginate and a soluble salt of the metal required. With the exception of the ferric alginate—

Alginoid Iron, therapeutic trials are incomplete; but those made with the ferric compound appear to speak well for the remedial value of the alginoids in general. A ferrous salt cannot be obtained by precipitation, but the ferric salt is obtained as a gelatinous brown precipitate by decomposing ferric chloride with sodium alginate, both in solution. When dry, it forms a tasteless insoluble brown powder, having a composition leading to the formula $C_{76}H_{77}Fe_3N_2O_{22}$, and containing 10.97 per cent. of Fe. It is soluble in ammonia, forming a deep reddish-brown solution. Given in cases of anæmia and chlorosis, even where gastric ulceration was present, the remedy has been well borne, and showed a sedative action by arresting vomiting and sickness. It has no astringent effect on the bowels, and does not produce constipation; on the contrary, the effects are slightly laxative. It is given in doses of from 2 to 15 grains of the dry powder, good effects having been obtained with the smaller dose. The author briefly describes the alginates of the metals before mentioned, and promises to contribute the results of further studies upon the same subject in a future communication.—Proc. Brit. Pharm. Conf., 1898, 364–368.

Tannin—Estimation by Means of Silk.—Vignon recommends untwisted silk as superior to either gut-strings or powdered hide for the estimation

of tannin in aqueous solutions. If an excess of silk (about 5 Gm.) is immersed in a solution of 0.1 Gm. of tannin in 100 Cc. during 4 or 5 hours at a temperature of 50°, the tannin will be completely absorbed, but none of the substances that usually are present, such as gallic acid, glucose, etc. The quantity of absorbed tannin may then be determined in several ways: by direct weighing; by the difference in the weight of extract obtained from equal weights of the solution before and after treatment, and by titration with permanganate before and after treatment with silk—1 Cc. of permanganate solution containing 3.164 Gm. $KMnO_4$ per liter, corresponding to 0.004155 Gm. tannin.—Pharm. Ztg., Nov. 5, 1898, 791; from Journ. de Pharm. et de Chim., 1898, No. 8.

Tannin—A Sensitive Reaction with Gold Chloride.—Dr. A. Leyde has observed that when solution of gold chloride is added to very dilute solutions of tannin, the reduction which the gold salt suffers manifests itself in a purple coloration which, even in extremely dilute tannin solutions, is still recognizable by a red coloration produced. Thus, if red wine, for instance, be diluted with water so that it cannot be distinguished from water by its color, the addition of sodium-gold chloride causes the gradual development of a red color, which, beginning in about 10 minutes, reaches its maximum intensity in about 30 minutes, and maintains this for some time. The reaction is most successful in neutral or faintly acid solutions. —Chem. Ztg., 1898, 1085.

Tannoids—Natural System of Classification.—Kunz-Krause proposes a system of classification of the tannins which is based upon the observation that the color reactions produced by ferric chloride with gallic and protocatechuic acids respectively, blue-black in the first and green in the latter case, is shared by their respective derivatives. This permits the classification of all tannins into two principal groups, the "protocatechutannoids" and the "gallotannoids," the individual members of which are derivatives of protecatechuic acid on the one hand, and of gallic acid on the other, in accordance with the color reactions mentioned. These again, are divisible into non-glucosidal compounds and glucosidal compounds; the non-glucosidal compounds being subdivided into *tannogens* and into the *true tannoids*, while the glucosidal compounds are sub-divided into the *glucotannoids* and the *phloroglucotannoids*. Throughout these four sub-divisions, or groups, thus established, the distinction between protocatechutannoids and gallotannoids is clearly defined, as is also their separation into tannoids of the benzol series and of the styrol series in accord with their respective bases, oxybenzoic or oxycinnamic acid. — Pharm. Zeit., Nov. 5, 1898, 791; from Schweiz. Wochensch. f. Chem. u. Pharm., 1898, No. 39.

Tannate of Gelatin (Tannocoll)—Preparation.—According to a French patent, tannocoll is prepared as follows: Ten liters of a 1 per cent. solution of gelatin are mixed with 2 liters of a 5 per cent. solution of tannin,

the precipitate collected, washed, pressed, and dried by exposure in thin layers to the air until it no longer melts when exposed to the heat of a water-bath. It is then heated up to 150° C. until the last traces of water are removed, for if this is not done, the preparation is liable to become putrid. It is so obtained as a pale yellow, odorless and tasteless powder. —Chem. Ztg., 1899, 89.

Tannopin—Remedial Value.—Dr. G. Joachim has found tannopin—a condensation product of tannin and urotropin introduced as a remedy in intestinal catarrh—to be a most valuable remedy for the treatment of infantile diarrhœa, cholera noska, and enteritis. The remedy is found to be quite harmless in doses of 0.3 to 0.5 Gm. four times in twenty-four hours, given to the youngest children, while older children and adults may take from 0.5 to 1.0 Gm. Combined with calomel (0.005 pro dosi) the effect of the tannopin in cases of choleraic diarrhœa is increased.—Therap. Monatsh., *12*, 631.

Gallic Acid—Reaction with Tartar Emetic.—Some doubt having been expressed by Dr. Sillar as to the accuracy of the British Pharmacopœia statement that solution of gallic acid gives no precipitate with solution of tartar emetic, D. B. Dott has made experiments which confirm Dr. Sillar's view. A sample of gallic acid of average quality, as well as the twice crystallized product of the same, gave an abundant precipitate, contrary to the official statement. It appears that basic antimony tartrate and potassium gallate are formed by the reaction.—Pharm. Journ., Jan. 21, 1899, 58.

Gallic Acid—Products of Reaction with Formic Aldehyde.—By heating a mixture of two molecules of gallic acid and 1 molecule of formic aldehyde with fifteen times the quantity of dilute hydrochloric acid (1:5), R. Möhlau and L. Kahl have succeeded in isolating a new crystallized substance,

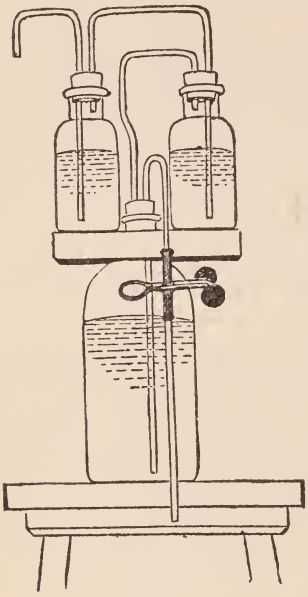
Methylene-Digallic Acid, the anhydride of which has the composition $C_{15}H_{10}O_9$. The new acid is with difficulty dissolved (by water [?] Rep.). It dissolves in concentrated sulphuric acid with a yellow color, turning a cherry red by the action of nitric acid. Its alkaline solution acquires a red color when exposed to the air. If its solution in concentrated sulphuric acid is heated slowly, the yellow color changes to green at about 50°, then to an intense blue, and a new acid,

Formaldehyde-trioxy-fluorone-dicarbonic Acid, $C_{13}H_{15}O$, is formed. This constitutes a crystalline violet powder, and is a suitable coloring matter for mordants. The acetyl-derivatives melt at 140.5–141.5°, at the same time turning brown. Its benzoyl-derivative crystallizes from alcohol in colorless prisms melting at 250.5–252.5°, while the tetracetyl derivative forms brilliant flakes melting at 241° C.—Chem. News, Nov. 25, 1898, 267; from Ber. d D. Chem. Ges., xxxi., 1898.

Pyrogallic Acid—Simple Method of Preserving its Solutions.—Randolph

Bolling has described the simple apparatus for preserving solutions of pyrogallic acid, shown by Fig. 67, which may be easily constructed with a few bottles and a yard of glass tubing. Take a quart bottle, which is to serve as a stock bottle, provide it with a bi-perforated cork, and pass a bent glass tube through it to the bottom; now connect a short tube by means of a rubber tube to this and you have a siphon; slip a pinch-cock on the tubing so as to regulate the flow of the liquid. Above the large bottle is a yoke of wood having a slot sawed in it. This fits the neck firmly and serves as a support for the two absorption bottles, which are connected with each other and the central bottle with glass tubes; so that when the pinch cock is opened the liquid flows out of the stock bottle by way of the siphon and the air to replace it bubbles through both the absorption bottles. The two small bottles are filled with a strong solution of potassium hydroxide and pyrogallol dissolved in water, so that the air in coming into the apparatus has to bubble through a solution which completely removes all the oxygen, leaving only the nitrogen, which has no action on pyrogallic acid. A developing solution can be kept for years without the slightest alteration, it is stated, by the aid of this apparatus.—Merck's Report, Aug. 15, 1898, 504.

FIG. 67.



ORGANIC BASES.

Alkaloids—Quantitative Determination in Solid and Fluid Extracts, Tinctures, etc.—C. Kippenberger, after an exhaustive study of the different methods proposed for the assay of alkaloids in solid and fluid extracts, tinctures and the like, finds the most efficient and generally available method to be one which depends upon the precipitation of the alkaloid as iodohydrate of periodide, purification of the periodide by solution in acetone, decompostition of this by caustic alkali, and final shaking out with chloroform. The method excludes such bases as choline, betaine, or xanthine bodies; for, although these bases are precipitatable by iodine, their precipitates are easily dissolved by the potassium iodide if used in the prescribed quantity. The reagents that require definition are:

The Iodine Solution, prepared by dissolving 20 Gm. iodine and 60 Gm. potassium iodide in water, and diluting to 1 liter.

The Hydrochloric Acid, is the *diluted* hydrochloric acid of the Germ. Pharm.

The Acetone should be pure. The cheaper commercial sorts are usually contaminated with small quantities of a body which remains as a yellowish resin-like residue on evaporation. It may be removed by agitating the acetone with powdered quick-lime, filtering, and fractionating the filtrate by distillation at 55–57°.

The preparation to be examined, if strongly alcoholic, needs no preliminary treatment; if, however, it is a hydro-alcoholic or aqueous preparation—extracts and the like—it must preliminarily be dissolved in strong alcohol, to which a certain percentage of hydrochloric acid has been added (tartaric acid in the case of aconite) and filtered off from the more or less abundant, and generally smeary, precipitate. An aliquot part of the filtrate is then evaporated on the water-bath, the residue dissolved in water, filtered, and the filtrate transferred to a beaker, in which the precipitation of the alkaloid as idiohydrate of periodide is then effected by adding the prescribed quantity of the "iodine solution" (usually 20 Cc. for 1 to 5 Gm. of extract, according to kind used). In most cases 5 to 10 minutes are sufficient for the complete deposition of the precipitate; but if it is desired that the precipitate shall become crystalline, the mixture must be allowed to stand from 20 minutes to an hour. In either case, the precipitate is collected on a small plaited filter, and washed two or three times with water to which a few drops of the iodine solution has been added; or a little sodium chloride may be dissolved in the wash water, which is particularly recommended in the case of atropine. The washed precipitate is now dissolved in "acetone" (of which from 15 to 20 Cc. are required for 1 to 5 Gm. extract employed), observing that it shall completely enter solution and that there shall be no waste. The acetone solution is then treated with "alkali hydrate solution" in excess, then "hydrochloric acid" in excess; the mixture is diluted with water, and shaken out with "petroleum ether," to remove the acetone, the last traces of which are removed by heating on the water bath. The liquid is now supersaturated with alkali hydrate, and shaken out with "chloroform,"—by preference—though a mixture of "ether and chloroform" may also be used. The chloroformic solution of the pure alkaloid so obtained is cautiously evaporated and its amount determined either by direct weighing or by titration.

According to the drug, or the preparations from it, that is to be assayed, there must be some variation in the amount of solvents and precipitant. These are indicated by the author in the following examples:

Alcoholic Extract of Nux Vomica: 1.5 Gm. of the extract are dissolved in 75 Cc. of water containing 1.5 Cc. "hydrochloric acid" and 50 Cc. of the filtrate (= 1.0 Gm. extract) are mixed with 20 Cc. of the "iodine solution."

Aqueous Extract of Nux Vomica: 2.0 Gm. of the extract are dissolved in 80 Cc. of alcohol containing 2 Cc. of "hydrochloric acid," 60 Cc. of

the filtrate are evaporated on a water bath, the residue is dissolved in 75 Cc. of water containing 1.5 C.c of "hydrochloric acid," and 50 Cc. of the filtrate from this (= 1.0 Gm. extract) are mixed with 20 Cc. of "iodine solution."

Tincture of Nux Vomica: 60 Cc. of the tincture are evaporated on a water bath to dryness, the residue dissolved in 60 Cc. of water containing 2 Cc. "hydrochloric acid," and 50 Cc. of the filtrate (= 50 Cc. of tincture) are mixed with 20 Cc. of "iodine solution."

Powdered Nux Vomica: 15 Gm. of the fine powder are extracted with a mixture of 140 Cc. alcohol, 7 Cc. water and 3 Cc. "hydrochloric acid," 100 Cc. of the filtrate are evaporated to dryness, the residue dissolved in 66 Cc. of water containing 2 Cc. "hydrochloric acid," and 45 Cc. of the filtrate (= 7.5 Gm. of the seed) are mixed with 20 Cc. of "iodine solution."

Extract of Aconite Root: 7.5 Gm. of the extract are dissolved in 75 Cc. of water containing 3.0 Gm. of *tartaric acid*, and 50 Cc. of the filtrate (= 5.0 Gm. of extract) are mixed with 20 Cc. of the "iodine solution."

Tincture of Aconite Root: 100 Cc. of the tincture are evaporated to dryness with 1 Gm. of *tartaric acid*, the residue is dissolved in 60 Cc. of water containing 1 Cc. of "hydrochloric acid," and 45 Cc. of the filtrate (= 75 Cc. of the tincture) are mixed with 20 Cc. of "iodine solution."

Powdered Aconite Root: 18 Gm. of the fine powder are extracted with 180 Cc. of alcohol containing 3.0 Gm. of *tartaric acid*, and 120 Cc. of the filtrate are evaporated to dryness. The residue is dissolved in 60 Cc. of water containing 2 Cc. of "hydrochloric acid" and 50 Cc. of the filtrate (= 10 Gm. of aconite root) are precipitated with from 20 to 40 Cc. of "iodine solution."

Extract of Belladonna (either from leaves or root): 7.5 Gm. of the extract are treated with 75 Cc. of alcohol containing 2 Cc. of "hydrochloric acid," and filtered; 60 Cc. of the filtrate are evaporated to dryness, the residue dissolved in 60 Cc. of water containing 1 Cc. of "hydrochloric acid," the solution filtered, and 50 Cc. of the filtrate (= 5.0 Gm. of the extract) are mixed with 30 Cc. of "iodine solution."

Tincture of Belladonna: 100 Cc. of the tincture, mixed with 1 Cc. of "hydrochloric acid," and evaporated to dryness; the residue is dissolved in 50 Cc. of water containing 1 Cc. of "hydrochloric acid," and 40 Cc. of the filtrate (= 80 Cc. of tincture) are mixed with 20 Cc. of "iodine solution."

Extract of Hyoscyamus: 12.0 Gm. of the extract are treated with 120 Cc. of alcohol containing 2.5 Cc. of "hydrochloric acid," and filtered. 100 Cc. of the filtrate are evaporated to dryness, the residue is dissolved in 60 Cc. of water containing 1 Cc. of "hydrochloric acid," filtered, and

45 Cc. of the filtrate (= 7.5 Gm. extract) mixed with 20 Cc. of "iodine solution."

Tincture of Hyoscyamus: 200 Cc. of the tincture and 2 Cc. of "hydrochloric acid" (or so much as may be necessary to give a distinctly acid reaction) are evaporated to dryness. The residue is dissolved in 50 Cc. of water, the filtrate rendered acid, if necessary, by the addition of a little "hydrochloric acid," and 40 Cc. of it (= 160 Cc. tincture) are precipitated with 10 to 20 Cc. of "iodine solution."

Alcoholic Extract of Cinchona: 1.5 Gm. of the extract are dissolved in 75 Cc. of water containing 3 Cc. of "hydrochloric acid," and to 50 Cc. of the filtrate (= 1.0 Gm. extract) 20 to 30 Cc. of "iodine solution" are added (the iodine solution for this purpose being best made with only 30 Gm. KI per liter).

Aqueous Extract of Cinchona: 2.0 Gm. of the extract are treated with 80 Cc. of alcohol containing 3 Cc. of "hydrochloric acid," filtered, and the filtrate evaporated to dryness. The residue is dissolved in 75 Cc. of water containing 2 Cc. of "hydrochloric acid," and 50 Cc. of the filtrate (= 1.0 Gm. extracted) are precipitated with 20 to 30 Cc. of "iodine solution," modified as under the preceding.

Tincture of Cinchona.—30 Cc. of the tincture are evaporated to dryness, the residue is dissolved in 60 Cc. of water containing 3 Cc. of "hydrochloric acid," the solution filtered, and 50 Cc. of the filtrate (= 25 Cc. of tincture) treated with 20 Cc. of "iodine solution," modified as under "Alcoholic Extract of Cinchona."

Cinchona Bark: 9 Gm. of the finely powdered bark are extracted with 90 Cc. of alcohol containing 9 Cc. "hydrochloric acid" and 60 Cc. of the filtrate are evaporated to dryness. The residue is dissolved in 60 Cc. of water containing 6 Cc. of "hydrochloric acid," and 50 Cc. of the filtrate (= 5 Gm. bark) are precipitated with 30 to 40 Cc. of "iodine solution," modified as suggested under "Alcoholic Extract of Cinchona."

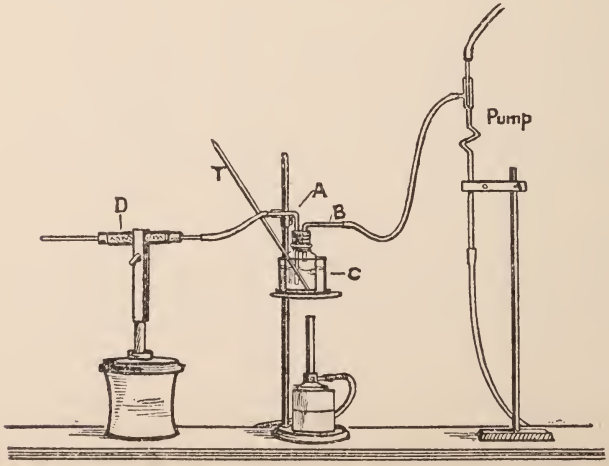
In carrying out these assays, it should be remembered that "hydrochloric acid" and "iodine solution" are those designated in the beginning of this abstract. The "evaporations" are to be made in a porcelain capsule, on a water bath—the precipitation in a beaker.—Apoth. Ztg., Sept. 21 and 24, 1898, 664–666 and 672–674.

Alkaloids—Method of Extraction for Assay as Periodides.—In order to avoid certain difficulties experienced in working according to a method previously described, H. M. Gordin and A. B. Prescott now recommend a method for the extraction of alkaloids to be assayed as periodides, which in its main features is the same as that which they proposed for the assay of opium (see Proceedings, 1898, 840). Omitting the details, this improved method is briefly as follows: The finely powdered drug is triturated to a paste with a mixture composed of 5 vols. each of stronger

ammonia and alcohol, 10 of chloroform, and 20 of ether. More of the solvent is added, and the whole is macerated, with frequent stirring, in an arrangement which prevents loss of solvent by evaporation, during four or five hours. Then the mixture is exposed to a current of air until the odor of ammonia has completely disappeared, and a dry powder results—the final drying being done in a vacuum desiccator over sulphuric acid for about four or five hours. This dry powder, mixed with about 5 or 6 times its weight of sodium chloride, is exhausted by percolation with chloroform, or other suitable ethereal menstruum, the percolate evaporated at about 30° C., to a small bulk, mixed with acidulated water, and the ethereal liquid completely driven off at the same temperature. The filtrate obtained is colorless, and may be at once used for the assay as periodide, which consists in pouring the final solution, representing a definite quantity of the drug, slowly and with constant stirring into a flask containing an excess of standardized solution of iodine and about 5 per cent. of dilute hydrochloric acid. An aliquot portion of the clear liquid is filtered off, and the excess of iodine determined by means of standard sodium thiosulphate. The amount of iodine consumed, multiplied by the suitable factor, gives the amount of alkaloid present in the quantity of drug taken.—Amer. Journ. Pharm., Jan., 1899, 14–18.

Alkaloidal Assay—Drying of Residues.—The new British Pharmacopœia directs the alkaloidal residues in the assay of opium preparations to be dried at 110° C. for two hours before determining their purity by titration. This entails considerable trouble to the pharmacist, which is overcome by R. C. Cownley by the simple contrivance and method illustrated by Fig. 68. A 50 per cent. solution of fused calcium chloride, or a corresponding

FIG. 68.



Apparatus for Drying Alkaloidal Residues.

weight of the crystallized salt, boils at 110° C., and gives us a means of obtaining the requisite temperature, water being added from time to time to retain it; but by fixing a thermometer in the bath, and keeping the flame of the Bunsen low, after the required temperature has been reached, the frequent addition of water is not necessary. The alkaloid, as collected on the filter-paper, is folded up and placed in a small wide-mouth bottle furnished with a rubber bung having two perforations. Two glass tubes, *A* and *B*, pass through these holes, *A* to the bottom of the bottle, and *B* terminates just within the bung. The bottle with the alkaloid is placed in the calcium-chloride bath, *C*. The tube *A* is connected with a drying-tube, *D*, containing small pieces of quicklime. *B* is attached to a Geissler's filter-pump. Heat is now applied to the bath, and the water is turned on to the pump, and dry air is sucked through the whole apparatus, As the tube *A* passes to the bottom of the bottle the air becomes heated, so that moist air is continually displaced by warm dry air. At first a condensation of water takes place beyond the bend in the tube *B*, and when this has disappeared it has been experimentally determined that the alkaloid is dry. A similar method is adopted in drying other alkaloidal residues—using a water-bath. Where a number of assays are made the loss of the alkaloidal solvent is a consideration. Instead of evaporating the solution in a tared dish, as is usually done, the solution may be collected in a small tared flask, from which the solvent is distilled; the distillate may be repeatedly used. The moisture left in the flask is removed by attaching the flask to the drying apparatus in the place of the wide-mouth bottle.—Chem. and Drugg., Nov. 19, 1898, 833.

Alkaloidal Assay—Use of Tragacanth to Prevent Emulsification.—N. Rusting communicates the details of experiments made to shorten and improve the method in common use for the assay of alkaloids in plant extracts. He has found that the troublesome emulsification which occurs when aqueous solutions of plant extracts are shaken out with ether, chloroform, petroleum ether, etc., may be completely overcome by adding a certain small quantity of powdered tragacanth to the mixture *after* shaking thoroughly, and then again shaking. The tragacanth unites with the watery portion, forming a more or less viscid mass, from which the ethereal solution readily separates perfectly clear and may be decanted. A general method based upon this observation is carried out as follows: 2 Gm. of the extract are dissolved in 10 Cc. of water, 50 Cc. of the ethereal fluid, selected according to the substance under examination, are added, followed by 2 Cc. of 5 per cent. sodium hydrate solution. The mixture is well shaken during 5 minutes, 2 Gm. of powdered tragacanth are added, and the mixture is again shaken vigorously for half a minute. After standing a short time, 40 Cc. of the ethereal liquid are decanted, the ether is evaporated and the alkaloid determined in the residue acidimetrically, or by any other suitable method. As shaking out fluid, a mixture of 20 vol. chloro-

form and 80 vol. of petroleum ether answers a good general purpose; in others the proportions must be varied, or ether, chloroform, or a mixture of these must be used.—Pharm. Centralh., Aug. 18, 1898, 603.

Alkaloids—A New and Delicate Precipitant.—According to G. Bertrand, silicotungstic acid, $(WO_3)_{12}SiO_3.2H_2O$, or its alkali salts, is a very delicate precipitant for alkaloids, giving precipitates which are voluminous, easy to collect, perfectly stable, insoluble in water or dilute acids, but readily liberating the alkaloids when treated with fixed alkalies or ammonia. These precipitates have the formula $(WO_3)_{12}.SiO_3.2H_2O$ 4alkaloid$+nH_2O$. Oxidizing agents readily decompose these compounds, so that the silicotungstic precipitate may be used directly to obtain characteristic color reactions, such as that of strychnine with dichromate and sulphuric acid.—Compt. rend., cxxvii., 742.

In a second paper, the author reports that the new reagent is free from the objections raised against many reagents at present employed as alkaloidal precipitants. Thus it does not precipitate the salts of potassium and ammonium, as is the case with platinic chloride. It is cheap, is well adapted for the separation of alkaloids, and gives stable, well-defined salts, which are easily analyzed with exactness. Its high molecular weight —about 3,000—is a further advantage, and renders it especially suitable for some analytical determinations. In short, it is the most sensitive of all the known alkaloidal precipitants, and nothing is easier than to obtain the alkaloid from the precipitates. It is employed in the form of solutions containing 5 Gm. of the crystallized acid or the sodium salt in 100 Cc. of distilled water. The action of the reagent was tried on a number of glucosides and other substances—amygdalin, arbutin, coniferin, digitalin, salicin, asparagin, starches, tannin, gum arabic, etc. Except with albuminoid bodies, for which the acid is a delicate reagent, no precipitate was obtained either in acid or neutral solution.—Pharm. Journ., June 3, 1899, 503; from Bull. Soc. Chim. de Paris, *9*, 434.

Alkaloids —Micro-chemical Determination in Drugs.— Barth has made comprehensive and interesting studies concerning the micro-chemical determination of alkaloids in medicinal drugs. Among other interesting observations he has determined that the alkaloids are not formed in the cellular membrane, but in the plasma, from which they afterward reach the cellular fluids, in which they meet with acids and form salts. Besides the customary group reagents the author has employed a large number additional ones. He aimed to convert the alkaloids into crystalline compounds while still in the cell, and then to identify them by means of the polariscope, and by characteristic color reactions. For the purposes of comparison, sections of the unchanged drug, as well as such from which the alkaloids had been extracted, were subjected to these examinations. The reagents were in part employed in form of vapor. The drugs embraced in the author's examination and studies were the following: The

fruits of *conium maculatum;* the alkaloid here was found only in both of the most interior layers of the fruit-wall, and in the external surrounding of the ribs. In the seeds of *peganum harmala* it was found only in the third, large-celled layer of the seed coat. In *hyoscyamus niger*, *datura stramoniun*, and *atropa belladonna*, alkaloids were found principally in the nutritive layer, small quantities only in the endosperm and embryo. In *colchicum autumnale*, colchicine was found in all parts of the plant, and in the ripe seed by preference in the collapsed seed-coat. In *sabadilla officinarum* the alkaloid was found in the endosperm and embryo. The endosperm-cells of *areca catcchu* were found to contain alkaloid. Strychnine and brucine were found in all the cell-contents of the endosperm of *strychnos nux vomica*, but in the embryo brucine alone was found. In *physostigma venenosum*, alkaloid was found only in the cotyledons *strychnos potatorum*, L. pl., *S. epinosa*, Lam., and a third species of *strychnos* contains no alkaloid in the seeds, while *strychnos St. Ignatiii* contains alkaloid in the endosperm, and *strychnos spinosa*, Harv., contains only traces of alkaloid in the 3 or 4 outer cell-rows of the endosperm. To determine the question whether the alkaloids contained in the seed and fruits of these plants are to be regarded as excretions, or whether they are again consumed during the germination, the author made a large number of germination experiments, and determined the alkaloid in the germinated seeds. He found the alkaloidal content in the germinated seeds to be only about one-fifteenth that of the seeds which had not undergone germination, and he concludes that alkaloids should be regarded not as products of the decomposition of albumin, but as albumin, the formation of which has not yet been completed. — Apoth. Ztg., Dec. 3, 1898, 848; Arch. d. Pharm., 1898, No. 5.

Alkaloids—Application of Vitali's Reaction to the Determination of their Constitution.—In an address before the Section of Pharmacy and Pharmacognosy at the meeting of German Naturalists, at Dusseldorf (Sept. 22, 1898,), Dr. Hermann Kunz-Krause calls attention to the availability of Vitali's test—depending on the color reaction produced by fuming nitric acids in contact with alkaloids—for determining the constitution of alkaloids. These reactions have heretofore been simply accepted as more or less characteristic color-phenomena, but the products of the reactions have not been studied, notwithstanding that they have been in use for many years. The author has made a comprehensive study of the products of the reaction upon a large number of natural alkaloids, which reaction, in many instances, is characterized both by the development of color and of odor. This odor, he finds, is due to the formation of methylcarbylamine, and is developed in all bases which contain a methylimide group in heterocyclic formation, when the base, after treatment with fuming nitric acid, is treated with potassium hydroxide. Organic bases that do not give the carbylamine are: Coniine, quinine, emetine, brucine, strychnine,

papaverine, veratrine and isocholine.—Apoth. Ztg., Nov. 19 and 23, 1898, 811 and 820.

Alkaloids of Yohimba Bark—Investigation.—In a former communication, Dr. L. Spiegel had given the results of the investigation of yohimba bark, in the course of which he established for its principal alkaloidal constituent,

Yohimbine, the formula $C_{23}H_{32}N_2O_4$. Continuing his investigations, he finds that upon heating yohimbine for some time at 120°–130°, or by evaporating its solution in absolute alcohol, a substance having the composition of the anhydride of the base is obtained, viz, $C_{23}H_{30}N_2O_3$. This anhydride is also produced in the preparation of

Yohimbine Hydrochloride, the only salt of the alkaloid hitherto obtainable in a crystalline condition. It melts at 295°–300°. By the formation of the iodmethylate of the alkaloid, yohimbine is shown to be a tertiary base. The iodmethylate is soluble in hot water with tolerable facility, but sparingly in cold water, separating from the hot solution as a syrupy mass, which afterwards becomes crystalline. By oxidation with permanganate yohimbine yields two acids, *yohimbic acid*, $C_{20}H_{24}N_2O_6$, and *noryohimbic acid*, $C_{19}H_{20}N_2O_7$. From the mother-liquor the author has endeavored to separate the second alkaloid present in the bark,

Yohimbenin.—The mother-liquors are acidified, shaken out with acetic ether, then rendered alkaline and again shaken out with acetic ether, which now dissolves the yohimbenin, and leaves it on evaporation in form of a faintly yellow armophous mass, melting at 135°, soluble in chloroform and in ether, and free from the fluorescent body that tenaciously accompanies the yohimba bases. The analytical data obtained approximate to the formula $C_{35}H_{45}N_3O_6$.—Chem. Ztg., 1899, 50.

Ethylmorphine Hydrochloride—A New Morphine Substitute.—Among the new morphine derivatives that have been received with favor by physicians the hydrochloride of ethylmorphine—$C_2H_5OHO.C_{17}H_{17}NOHCl + H_2O$—has received more than common attention. It has been introduced under the name of

Dionin, and possesses, among other advantages over the other morphine derivatives, that of greater solubility, being soluble in water in the proportion of 1 : 7, and therefore eminently suited for subcutaneous injection. The uncombined base, ethylamine, on the other hand, is characterized by sparing solubility, 100 parts of water dissolving only 0.35 parts of the base, and by forming strongly glistening, well-formed, prismatic crystals; while dionin is a white, odorless, bitter, microscopic-crystalline powder, melting at 123°–125° C. Its aqueous solutions give the ordinary reactions for alkaloids, and it is not distinguishable by the well-known color reactions from the nearly related codeine, but may be distinguished from this alkaloid or its salts by its behavior with ammonia, and depending on the sparing solubility of the free ethylmorphine. If to 5 Cc. of a 10 per cent.

solution of codeine hydrochloride a few drops of ammonia, sp. gr. 0.910, are added, a precipitate is produced, which is permanently dissolved on addition of 1 Cc. of the ammonia solution. In the case of dionin, the precipitate initially produced is not redissolved until 5 Cc. of the ammonia solution have been added; but, after standing a short time, the ethylmorphine is separated again in the form of crystals, and this separation occurs even in dilution of 1 : 100. Therapeutically, dionin stands much nearer in its narcotic action to morphine than does codeine, and it is free from the unpleasant after-effects of the other morphine salts and derivatives. According to Korte, dionin may be given several times daily in doses of 0.015 Gm., or in a single dose, at night, of 0.03 Gm., either in simple aqueous solution, in syrup, or as pills.—Apoth. Ztg., 1899, 15; from Therap. Monath.,. 1899, 33.

Heroin—A Substitute for Codeine.—Dreser has introduced the di-acetic ester of morphine as a substitute for codeine under the name of "heroin." The new compound, a nearer description of which is not given, is recommended in doses of 0.01 Gm. in cases in which codeine phosphate is usually given. Floret recommends it as being a prompt and reliable remedy for coughs, and particularly in those due to inflamed and catarrhal condition of the air passages—angina, pharyngitis, tracheitis, bronchitis, etc.—It may be given in form of powder, mixed with sugar, or in the form of drops prepared by dissolving the substance in diluted acetic acid.—Pharm. Ztg., Sept. 17, 1898, 667.

Hydrocotarnine—Electrolytic Formation from Cotarnine.—Bandow and Wolfenstein have obtained hydrocotarnine from cotarnine by electrolyzing it in solution of dilute sulphuric acid. The electrodes were formed by platinum foil, while the dilute sulphuric acid served as anode. The conversion of cotarnine—$C_{12}H_{15}NO_4$ — into hydrocotarnine—$C_{12}H_{15}NO_3$—is completed when a sample of the solution, treated with ammonia, furnishes a pure white precipitate, which by its melting point, 55°, is identified as hydrocotarnine. The authors have also obtained

Hydrohydrastine—$C_{11}H_{13}NO_2$ — by the electrolysis of hydrastine — $C_{11}H_{13}NO_3$—in the same manner.—Berichte, 1898, *31*, 1577. Apoth. Ztg., Sept. 17, 1898, 659.

Cotarnine Hydrochloride (*Stypticine*)—*Efficiency.*—Bakoffen has found stypticine (cotarnine hydrochloride) prompt and serviceable in the treatment of metrorrhagia. It is prescribed in doses of 0.025 to 0.050 Gm. three or four times daily, either with sugar in a cachet, or else in pills.—Pharm. Journ., No. 24, 1898, 669; from Bull. Gen. Therap., cxxxv., 931.

Hydrastine Hexiodide—A New and Definite Periodide.—H. M. Gordin and A. B. Prescott observe that when a solution of iodine in potassium iodide is added to a solution of a salt of hydrastine, a dense precipitate falls out, of a color varying from light brown to very dark brown. In the

order of mixing the alkaloidal solution with the iodine solution, a mixture of different periodides seems to be formed, no matter whether the addition of iodine is stopped while the alkaloid is yet in excess or carried till the iodine is in excess. But if the order of mixing be reversed, that is, the weak alkaloidal solution added to a large excess of iodine solution, a definite and unique periodide, namely, hydrastine hydriodide-pentiodide, is always formed. This hexiodide, which may be prepared according to the general method given by the authors in 1898 (see Proceed., 1898, 358) is a very dark brown powder, very difficultly soluble in ether, benzol, or cold chloroform, more easily in hot chloroform and in alcohol, and very easily in a mixture of alcohol and chloroform, or of alcohol and ether. Attempts to obtain it in crystals have hitherto failed. One part of this hexiodide is equal to 0.60403 of the alkaloid hydrastine.—Amer. Journ. Pharm., June, 1899, 257–259.

Cinchona Alkaloids—Assay with the Aid of Chloral Hydrate.—The extraordinary solvent action of a concentrated solution of chloral hydrate (8 to 5 parts of water) upon the dried cell-contents, well known to microscopists, has been successfully applied by Dr. W. Lenz to the extraction of alkaloids in assay process, and more particularly in the assay of cinchona bark. By its use the troublesome pulverization to extremely fine powder as well as the application of strong reagents is avoided, the process, as worked in the author's laboratory, being briefly as follows: 10 Gm. of the powdered bark are moistened in a flask of about 300 Cc. capacity with a solution of 20 Gm. of chloral hydrate in 12.5 Gm. of water, and allowed to stand over night. The somewhat tough mass formed is heated for one-half hour on a water-bath with 150 Cc. of diluted alcohol and 2 Gm. of hydrochloric acid, filtered through glass wool, and the residue washed with the aid of a suction pump to complete exhaustion with warm diluted alcohol containing a few drops of hydrochloric acid. The alcoholic solution is concentrated to the consistence of syrup, and this is carefully mixed with water acidulated with a few drops of hydrochloric acid so long as a separation of resin takes place, observing that this separation of resin shall be flocculent and not in a coherent mass. The filtered aqueous solution of the alkaloid is then made alkaline with soda solution and shaken out with three portions of 100, 50 and 50 Cc. of chloroform. This chloroform solution of the alkaloid is then, in its turn, shaken out with three portions of 100, 50 and 50 Cc. of water containing 2 per cent. of hydrochloric acid, and finally with some pure water. The acid aqueous solution is finally again made alkaline with soda solution and shaken out with 100 Cc. of ether, the ether solution removed as soon as it has separated, and repeating this shaking out in the same manner with fresh portions of 50 Cc. each of ether, until nothing more is dissolved by the latter. This part of the process must be carried out with expertness and expedition, so that the alkaloids which are with difficulty soluble in ether

may not separate from the solution into which they have temporarily entered. Evaporation to dryness and constant weight at 100° C. finishes the process. The alkaloidal residues obtained in this manner are colorless and apparently purer than those obtained by the process of the Pharm. Germ., while the yield is greater.—Pharm. Ztg., Sept. 24, 1898, 683.

Java Quinine—Quality and Commercial Method of Assay.—Elsewhere attention has been directed to the large export of quinine sulphate from Java (see *Cinchona*, under Materia Medica). J. B. Nagelvoort, speaking of the appearance in commerce of Java quinine, pronounces it as being a product of unusual excellence and much purer than what the pharmacists in the United States usually obtain. In the fresh state it was found to contain 14 per cent. of water of crystallization. The author has used and recommends for its examination the following method of assay: One Gm. of the sample is warmed in an air-bath to 100° C. for half an hour, in order to break up the possible double salts of the cinchona alkaloids, then transferred to an Erlenmayer flask with 10 Cc. of water, well corked, and immersed in water, warmed to 60° C. during half an hour, the flask being frequently shaken. The flask is then immersed for two hours in water maintained at 15° C., and shaken occasionally, and the fluid is then filtered off rapidly in a 2-inch funnel through a plain filter—a folded filter being unnecessary. The filtrate is then tested by Vierner's process. Into a test tube of a little over 10 Cc. capacity on foot, divided in ½ Cc., 5 Cc. of the filtrate are poured, followed by 4.5 Cc. of ammonia of 960, and the mixture cooled to 15° C. In the case of the Java quinine, a nearly clear solution is obtained, the few curdy flocks remaining suspended—and this is a peculiarity of the test—being entirely dissolved on addition and admixture of another 0.5 Cc. of the same ammonia.—Amer. Jour. Pharm., July, 1898, 345–346.

Quinine— Question of Basicity.—David Howard and D. Lloyd Howard, referring to a question as to the basicity of quinine, observe that this is somewhat difficult to answer because theoretical considerations lead to a different conclusion from that indicated by the use of indicators in volumetric testing. Everything points to the conclusion that the alkaloid is a "diammonia," or, as expressed more moderately, that each of the nitrogen atoms of the molecule represents a basic nucleus, one of which is much more powerful than the other. The formation of quinine salts points to the same conclusion. Sulphuric acid will form three definite crystalline salts; one molecule combining with two molecules of quinine to form the ordinary sulphate of commerce, with one molecule to form the "soluble sulphate" of commerce; or two molecules of acid will combine with one molecule of quinine to form the little-known "tetrasulphate." Under this view the soluble salt must be consistently regarded as the "neutral sulphate," and the ordinary sulphate of commerce as a basic salt. If, however, we study the salts of quinine by means of the ordinary tests for

acidity, we discover that the ordinary commercial sulphate is neutral in reaction and the soluble sulphate is acid. Therefore, whatever may be the theoretic conclusions formed as to the composition of the salts of quinine, there is no doubt of the convenience of the nomenclature adopted by the British, German, American, Dutch, and most other Pharmacopœias, which regard the familiar sulphate as neutral and the soluble sulphate as a bisulphate. We must, however, always be on our guard against confusion arising from the French nomenclature, which conforms to the theoretical composition of these salts.—Proc. Br. Pharm. Conf., 1898, 424–427.

Quinine—Thalleioquine Test.—Prof. F. J. Wulling observes that in applying the thalleioquine test for quinine or quinidine, chlorine water is not always at hand, and the official method requires apparatus and time. It will answer the purpose just as well, besides saving time, to introduce a grain of potassium chlorate into a one ounce bottle, add 3 drops of the official hydrochloric acid, stopper the bottle lightly, heat gently until the gas is evolved, and then add 6 fluid drachms of water and shake. In applying the test, success is usually had by adding half a grain of quinine to a drachm of the chlorine water, shaking, and adding about half an ounce or 6 drachms of water. Then add drop by drop ammonia water until the green color appears.—Pharm. Era, March 16, 1899, 338.

Cocaine Hydrochloride—A New Test for Purity.—Dr. George L. Schaeffer, in view of the doubts expressed by some chemists regarding the value of Maclagan's test of purity for cocaine salts, has made numerous experiments with the view to establishing by an easy and rapid method the presence in cocaine salts of the coca alkaloids not indicated by the well-known permanganate test. As a result, he has devised and recommended the following test, which is based upon the fact that cocaine chromate is soluble in 500 parts of acidulated water; the chromates of the objectionable alkaloids require 5,000 parts for solution. To carry out the test, 0.05 Gm. cocaine hydrochloride is dissolved in 20 Cc. of distilled water, mixed with 5 Cc. of a 3 per cent. solution of chromic acid, and then 5 Cc. of a 10 per cent. solution of hydrochloric acid—the temperature of the solution being kept at 15° C. In the case of pure cocaine hydrochloride, a clear solution results, while in the presence of more than traces of the foreign coca bases, the solution becomes cloudy at once, or in a few minutes, according to the amount present.

Commenting on this test, Mr. A. J. Cownley, while admitting it to be an excellent one, considers it to be so much more stringent than Maclagan's test, that it may be questionable whether Maclagan's should not be preferred as sufficient for commercial purposes.—Pharm. Journ., April 15, 1899, 336.

Cocaine Hydrochloride—Criticism on the Chromic Acid Test.—E. Merck, referring to the chromic acid test proposed by Dr. G. L. Schaeffer for establishing the purity of cocaine hydrochloride, states that he has made the remarkable observation that the degree of concentration of the

hydrochloric acid plays an important function in the reaction. A sample which was rendered turbid when an acid of 10 per cent. HCl was used, remained perfectly clear when a 7.5 per cent. acid was used; and, again, a sample which remained clear with a 10 per cent. acid becomes turbid when a 12.5 per cent. hydrochloric acid was employed. The age of the chromic acid solution also plays an important part. Solution of cocaine hydrochloride which remained clear on the addition of a freshly prepared 3 per cent. chromic acid solution, under the conditions of the proposed test, became turbid with the same chromic acid solution after it had been kept for 24 to 48 hours. The author emphasizes that Dr. Günther's observations to the contrary notwithstanding, Maclagan's test offers the best criterion for the absence of foreign alkaloids which are not detected by the permanganate test. He reviews and criticises the objections brought forward by Dr. Günther at some length, particularly those that are based upon the supposed greater solubility of the cocaine than of the associated foreign alkaloids. Experiments given in some detail show the apparent coëfficient of solubility of cocaine in water to be 1 : 1340, but the true coëfficient is much higher, namely 1 : 2590. Mr. Merck remarks in conclusion that in an experience covering the manipulation of many thousand kilograms of crude cocaine, he has invariably found that so long as a batch under process of purification failed to respond to Maclagan's test, the failure to respond was invariably traceable to impurities still present.—Pharm. Ztg., May 27, 1899, 367.

Cocaine Hydrochloride—Maclagan's Reaction due to the Presence of a Higher Homologue of the Base.—F. Günther, basing his opinion on further experiments, insists that Maclagan's test is not available for pure cocaine hydrochloride (see Proceedings, 1898, 1059). He finds that specially purified cocaine, physiologically normal in its action, does not give the reaction, whilst the mother liquor obtained in the process of purification answers it. He has succeeded in separating from these mother liquors a base—a homologue of cocaine—which was easily purified by recrystallization from petroleum ether, which is found to be soluble in water in the proportion of 1 : 2500 to 1 : 3000, whilst pure cocaine is soluble in 704 parts of water. The latter cannot therefore be precipitated from a solution containing 1 p. cocaine hydrochloride in 1000, which is the condition of Maclagan's test. The new base melts at 110°–111° C., whilst cocaine melts at 97°–98° C. From synthetic ethyl-benzoyl-ecgonine, first obtained by Merck in 1885, it is distinguished only by the higher melting point, that of the latter being at 108°–109° C. Both bases give Maclagan's reaction. The new base has the same left-handed rotatory power as cocaine, and the physiological action. Analysis gave results agreeing with the formula $C_{18}H_{23}NO_4$, and the author regards it as an isomer of ethyl-benzoyl-ecgonine.—Pharm. Journ., March 18, 1899, 251; from Ber. D. Pharm. Ges., (2) 9, 38.

Cocaine Hydrochloride — Maclagan's Test and the Solubility of Pure Cocaine.—Drs. B. H. Paul and A. J. Cownley, after briefly reviewing the bases that are known up to the present time to be associated with cocaine in the "crude cocaine" from which cocaine hydrochloride is prepared, express the opinion that it is quite possible that certain alkaloids in addition to those now known may yet be isolated. But be this as it may, they are convinced that Maclagan's test may be relied on for establishing the purity of a sample of cocaine hydrochloride. The existence of the isomeride of ethyl-benzoyl-ecgonine described by Günther and the cocainidine of Shaeffer (which see), may or may not be substantiated, but the authors emphasize that they have never met with the isomeride of ethyl-benzoyl-ecgonine in a sample of commercial cocaine hydrochloride that answers Maclagan's test. Concerning the co-efficients of solubility of pure cocaine established recently by E. Merck (which see above), viz., 1 : 1340 as the amount of solubility by direct solution of the base, and 1 : 2590 as the amount extracted by ether and chloroform from an aqueous liquid, the higher figure is due to the loss of alkaloid by decomposition into benzoyl-ecgonine. They have made, and record, experiments to determine the true solubility of cocaine under the conditions of Maclagan's test, and find it to be 1 part of pure cocaine in 1500 parts of water at 15.5° C.—Pharm. Journ., June 10, 1899, 525.

Cocaine Solutions—Sterilization in Moist Heat.—A. Legrand, referring to the well-known fact that cocaine hydrochloride is liable to be decomposed by boiling its aqueous solutions, expresses doubt as to the admissibility of its sterilization by the ordinary methods. Experiments, however, have determined that the anæsthetic activity of a 1 per cent. solution, though weakened if the operation is conducted by boiling over direct fire, remains unaffected if the process is conducted in the presence of water-vapor—in the autoclave for instance—even if a temperature of 120° C. be maintained during 20 minutes. Cocaine solutions can therefore be sterilized by this method with absolute security.—Apoth. Ztg., April 26, 1899, 222 ; from Nouv. Remèdes, 1899, 109.

Theobromine—Estimation.—The reactions of theobromine, like those of caffeine based on oxidation, being difficult to recognize, François proposes several tests, with minute instructions as to proper manipulation and quantities to be used. The test for purity is based on the very slight solubility of theobromine in strong alcohol, the most probable adulterant being caffeine ; the author has calculated the exact degree of solubility of both these substances in alcohol of 95 per cent., at a temperature of 21°. In testing for identity he dissolves 0.1 Gm. of theobromine in a warm mixture of 1 part of nitric acid to 2 parts of water, then adds 10 Cc. of a 10 per cent. silver nitrate solution. A cloudiness is caused ; the solution must be heated until it is clear on cooling ; colorless needles are deposited. Another method is to use hydrochloric acid, and then add 10 Cc. of sat-

urated bromine water; after heating to drive off the excess of bromine, the flask and its contents must be brought up to their original weight with distilled water. The cooled liquid stains the skin red. In determining the relative solubilities of theobromine and caffeine, the following constants were found: 10 Cc. of alcohol at 95°, saturated with theobromine at a temperature of 21°, contained 0.0045 Gm. in solution, and under the same conditions 0.0930 Gm. of caffeine was contained in solution. From these data it is easy to calculate the amount of adulteration by caffeine.—Chem. News, Nov. 18, 1898, 255; from Jour. de Pharm. (1898) vii., No. 11.

Strychnine—Modification of Dichromate Test.—About ten or twelve years ago, J. C. Wharton devised a modification of the potassium dichromate test for strychnine, and published the formula in the "Druggman." The said modification consisted in "diluting" or attenuating the strength of the potassium dichromate by about 500 times its own weight of calcined calcium sulphate (plaster of paris) very intimately mixed by long trituration, thus making a dry powder, which was to be used by sprinkling into a solution of strychnine in concentrated sulphuric acid, when the characteristic color reactions were given more clearly than if the unattenuated or pure potassium dichromate were used, and much better than a liquid or aqueous dilution of the said dichromate would do. The strongly hygroscopic character of the concentrated acid will, however, soon cause the color reactions to become less distinct, especially in the blue or first stage of the reactions, on account of the absorbed water, which dilutes the acid solution too much for the best manifestations of the consecutive colors. Having since employed the test in a number of post-mortem cases, the author found that a decided advantage is gained if, instead of dissolving the strychnine in concentrated sulphuric acid, as is usually done, the chloroformic solution of strychnine is mixed with the dry powder above mentioned, and the mixture warmed gently to evaporate the chloroform, thus leaving the strychnine intimately mixed with the attenuated dichromated powder. The dry powder resulting containing the strychnine, is to be sprinkled into a drop of concentrated sulphuric acid, and the characteristic colorations are easily observed, even with very small quantities of the powder, a number of consecutive tests being easily made in a single drop of the acid, and the various colors being seen side by side. The author has also found that a stronger dichromate mixture can be used under these modified conditions, and now recommends that 1 part of potassium dichromate and 99 parts of calcined calcium sulphate be triturated together to the finest powder. By mixing the chloroformic solution with a small quantity of this powder, evaporating and triturating at the same time, a very concentrated strychnine mixture can be obtained, which may be preserved for convenient examination in closed tubes, excluded from light, for an indefinite time.—Drug. Circ., Nov., 1898, 260.

Strychnine Hydrochloride — Percentage of Water of Crystallization.— The British Pharmacopœia states that at 100° C. strychnine hydrochloride loses 7.3 to 8.8 per cent. of water. There having been some controversy as to the amount of combined water in this salt, D. B. Dott has made experiments which show, in the first place, that the salt cannot be completely deprived of water at 100° C., that it loses weight very slowly at even 110° C., and that a temperature of 135° C. is necessary; and secondly, that the loss at the higher temperature in these samples was 7.67, 7.62, and 7.61 per cent. It would, therefore, appear that the hydrochloride does not crystallize with 2 mol., or that it effloresces with such extreme readiness as to assume the composition of 4 mol. of anhydrous salt to 7 mol. of water.—Pharm. Journ., Jan. 21, 1899, 58.

Strychnine Hydrochloride — Percentage of Water of Crystallization. — W. Harrison Martindale, referring to Mr. Dott's observations respecting the percentage of water of crystallization in strychnine hydrochloride, records the results of the examination of eight samples of this salt, six of them obtained from firms of repute and two of them carefully prepared by himself, and summarizes his observations as follows: (1) No commercial sample was obtained yielding 8.8 per cent H_2O. (2) Sublimation does not interfere with the estimation of water of crystallization. (3) The salt does not effloresce in the air. (4) The salt should be dried at about 130°, and it is not apparently decomposed even at 150°. The highest loss at 130° is shown by the author's table to be be 7.76 per cent., and the lowest 7.40 per cent. H_2O. The highest loss at 150° was 7.85 per cent. and the lowest 7.41 per cent.—Pharm. Journ., Feb. 11, 1899, 120.

Brucine—Composition.—N. Monfang and J. Tafel, who have comprehensively studied the characters of brucine, confirm by their researches the formula first assigned to this alkaloid by Dolfus, namely $C_{23}H_{26}N_2O_4$. It may be crystallized from water with 4 and with 2 mol. H_2O. The authors have obtained and describe *brucinic acid*—$C_{23}H_{28}N_2O_5 + H_2O$—*iodomethyl-brucinic acid*—$C_{24}H_{31}N_2O_5I + H_2O$; *nitrobrucine hydrate*—$C_{23}H_{28}N_3O_7$, and *desmethylnitrobrucinehydrate*—$C_{21}H_{21}(OH)_2(NO_2)N_2O_3$. —Apoth. Ztg., May 6, 1899, 253; from Liebig's Annal. Chem., 1899, *304*, 24.

Ouabaine—Crystalline Derivative.—Armand has obtained a crystallized derivative from ouabaine as follows: A mixture of 250 Gm. of pure acetic anhydride and 5 Gm. of zinc chloride is made, and when cool 25 Gm. of finely powdered anhydrous ouabaine—dried for 24 hours at 110°—is added all at once, and the mixture heated gently to about 30°–35°, to assist the reaction. . The temperature rises suddenly and spontaneously to 70°–75°, the ouabaine dissolves rapidly, and the solution acquires a brown color and becomes perfectly clear; but if it sinks to below 60° before this is effected, the solution must be heated gently to again bring it up to 70°. It is finally allowed to cool, and poured into five or six times its volume of warm water. On standing the derivative, which is

Heptacetine—$C_{30}H_{37}(C_2H_3O)_7O_{11}$—is deposited as a crystalline mass, and may be purified by recrystallization from boiling 85 per cent. alcohol. The yield is about 50 per cent. of well crystallized heptacetine, a large proportion of amorphous acetine being formed and held in solution.—Chem. News, Sept. 16, 1898, 146: from Compt. rend., cxxvi., No. 23.

Laurotetanine—Occurrence and Characters.—The occurrence of an alkaloid characteristic of different plants belonging to the *lauraceæ* was demonstrated by Dr. M. Greshoff, chemist of the Botanical Gardens at Buitenzorg, Java, in 1890 (see Proceedings, 1891, 635), who enumerates quite a number of laurinaceous plants from which he had isolated one and the same crystalline base. This base, having physiological action similar to strychnine, and producing tetanic convulsions when injected into the animal organism, was named in reference to the latter action and its distribution among the members of the *lauraceæ*, laurotetanine. J. D. Fillipo has now made a comprehensive investigation of laurotetanine from the bark.

Tetranthera citrata.—In 1886, Braithwaite and Farr isolated from the fruit of *daphinidium cubeba* (see Proceedings, 1887, 111), which have since been determined by Holmes to be identical with those of *tetranthera citrata*, an amorphous alkaloid, and which the author regards as being simply an impure form of laurotetanine. By a modification of the process employed by Greshoff he obtained only 50 grammes of the pure base from 20 kilos of the bark. It crystallizes from ether in nearly colorless needles, which become yellow at 120°–125° C. and then melt at 134° C. Its taste is faintly bitter and somewhat acrid. It is nearly insoluble in water, and only sparingly soluble in petroleum ether, ether and benzol, but readily in alcohol, chloroform, acetone and acetic ether. It forms crystalline sulphates, hydrochlorides, hydroiodides, and hydrobromides, and picrates, and has the composition, $C_{19}H_{23}NO_5$. Physiologically it acts like strychnine, but is less toxic.—Arch. d. Pharm., *236*, No. 8 (Nov., 1898), 601–622.

Cactus Alkaloids—Source and Characters of Different Kinds.—A. Heffter, in continuation of his researches on the cactus alkaloids, gives the following particulars concerning those heretofore obtained by him:

Pellotine, $C_{13}H_{19}NO_3$, exists to the extent of 0.89 per cent. in *anhalonium williamsi*. It crystallizes from alcohol in compact tables, which melt at 110° C., and is soluble in alcohol, acetone and chloroform. It gives an intense chameleon-red color when a drop of nitric acid is added to its solution in concentrated sulphuric acid.

Anhaline, $C_{10}H_{17}NO_3$, is obtained from *anhalonium fissuratum*. It crystallizes in prisms, melting at 115° C., and its solution in strong sulphuric acid gives a green color with nitric acid.

Mezcaline, $C_{11}H_{17}NO_3$, obtained from *anhalonium lewinii*, crystallizes in small white needles, melting between 150° and 160° C. It is very soluble in water, sparingly so in ether, and constitutes the active principle of mescal buttons, the same plant containing the following three bases:

Anhalonidine, $C_{12}H_{15}NO_3$, crystallizing in octohedra, melting between 150° and 154° C., very soluble in water, and producing a strongly alkaline solution, capable of precipitating metallic salts from solution;

Anhalonine, $C_{12}H_{15}NO_3$ (isomeric with anhalonidine), but less soluble in water, and melting at 85.5° C.; and

Lophophorine, $C_{13}H_{17}NO_3$, an amorphous colorless base, which produces a crystalline hydrochloride.—Pharm. Journ., Jan. 21, 1899, 52; from Journ. de Pharm. et Chim., (6), *8*, 679.

Veratrine—Examination of Commercial Sorts.—Reviewing the chemical history of the alkaloidal substances known under the name of veratrine, from which it appears that commercial veratrine may be composed of three distinct alkaloids, namely veratrine, sabadilline and cevadine. Geo. B. Frankforter and Levi B. Pease communicate the results of the examination of veratrine, as supplied by Merck, Tromsdorff, Powers and Weightman and Mallinkrodt. These results make it evident that the principal part of veratrine in the market at the present time is identical with the substance known as cevadine, and confirm the observation heretofore made that cevadine is the principal constituent of commercial veratrine. Some older samples examined were found to resemble the "veratria" of Caventou, and were, as hitherto found, a mixture of several substances; whereas the recent product of the market in no case showed more than a small per cent. of either of the other substances known as veratrine. True cevadine has been obtained, and is now in comparison with common veratrine.—Amer. Journ. Pharm., March, 1899, 130–133.

Veratrine—Availability and Products of Vitali's Reaction.—In his study of the products of Vitali's reaction upon alkaloids (which see before), Dr. Kunz-Krause had determined that veratrine, when treated with cold nitric acid, yields a yellow solution. This, on evaporation, leaves a yellow residue, which on treatment with aqueous potassium hydrate becomes yellowish brown, but with alcoholic potassium hydrate assumes a blood-red color. At the same time an intense odor of coniine is developed. Prof. Kondakow now states that he discovered this reaction several years ago (1897), and has since studied it both qualitatively and quantitatively. He finds that if veratrine is treated with concentrated or fuming nitric acid, and the product is then evaporated to dryness, either at the ordinary temperature, or on the water-bath, a yellowish residue is obtained which when moistened with a 10 per cent. alcoholic potassium hydrate solution becomes blood-red, while with small quantities of the substance a raspberry-red color is produced. At the same time the odor of coniine is developed,

and the identity of this has been determined absolutely by isolating the coniine and subjecting it to suitable tests. The author, furthermore, finds the color reaction described to be extremely sensitive — the raspberry-red color being developed in solutions containing 0.0013 veratrine in 1 Cc., while the coniine odor is perceptible from even more dilute solutions, viz., 0.00025 veratrine in 1 Cc.— Apoth Ztg., Jan. 14, 1898, 25; from Chem. Ztg., 1899, 4.

Napelline—A Remedy for the Morphine Habit.—At a recent meeting of the "Societé de Thérapeutique," of Paris, Dr. Rodet warmly recommended napelline for the treatment of the morphine habit. He has administered in subcutaneously in doses of 3 to 5 Cc. of a one-half per cent. solution with excellent results. It quiets the nerves and allays the condition of anxiety of the patients suffering from the morphine habit when the morphine is refused, while the desire for the narcotic is gradually allayed and eventually overcome. The napelline is obtained from the mother liquors from which aconitine has crystallized out as nitrate. The addition of ammonia to these mother liquors occasions a copious precipitate, which condenses to a brown, resinous mass; this, when purified with animal charcoal, yields an amorphous, glassy mass, having a bitter but not acrid taste, and is soluble in water. It has relatively feeble toxic action.—Apoth. Ztg., May 6, 1899, 252; from Bull. Gén. de Thérap., etc., 1890, 481.

Mydriatic Alkaloids — Definite Characterization. — The confusion formerly prevailing in regard to the alkaloids of the mydriatic group has been so far overcome by the researches of Schmidt and others that it is now possible to obtain in commerce products of definite chemical composition and of a high degree of purity. H. A. D. Jowett, calling attention to these facts, observes that the description and test of the official members of this group given in the B. P., 1898, are generally unsatisfactory, and in some cases misleading and inaccurate. Some of the statements and conclusions on the same subject by Dr. G. Sharpe in 1897 (see Proceedings, 1898) are also not in accord with our present knowledge. The only alkaloids belonging to this group which can at present be definitely considered as chemical entities are atropine, hyoscyamine, and scopolamine (hyoscine). These are bodies of definite composition, whose chemical and physical properties have been carefully studied. In addition to these bases pseudo-hyoscyamine, from duboisia myoporoides, isomeric with atropine and hyoscyamine, has been described by Merck, but its relation to its isomers has not yet been worked out. As already pointed out by Dr. Sharpe, the several names which have been used for a mixture of these alkaloids, as daturine, duboisine, light atropine, etc., should once and for all be abandoned, as they only represent variable products obtained from a particular plant, and consist chiefly of atropine and hyoscyamine. With regard to the B. P. tests of identity and purity of the several official mydriatic alkaloids, certain amendments aud additions

are suggested. In the case of atropine, the insertion of the color test with fuming nitric acid and potassa is quite unnecessary, the following being suggested as sufficient to insure a pure product: (1) Melting point; (2) formation and melting point of aurochloride; (3) optical inactivity; (4) freedom from ash or ignition. Hyoscyamine is distinguished from atropine by its optical activity. The melting point of the sulphate should be given as *not lower* than 200°. The solubility in water of scopolamine (hyoscine) hydrobromide—1 in 1—is not correct, that given by Hesse—1 in 4—being more correct. In fact, taken as a whole, the characters and tests given for the hydrobromide in the B. P. are very unsatisfactory, and require correction on lines pointed out by the author.—Proc. Brit. Pharm. Conf., 1898, 428–432.

Hyoscyamine — The Principal Alkaloid of Hyoscyamus Muticus.—I. Gadamer, in a preliminary paper, communicates the results of chemical investigation of *hyoscyamus muticus* derived from Egypt, where it is said to be employed for criminal poisoning. The material consisted of seed capsules, leaves, axils and roots, and the author's results with this material confirm those obtained by Dunstan and Brown (see p. 525) with the Indian *hyoscyamus muticus*, in that he finds *hyoscyamine* to be the principal alkaloid of the plant. This alkaloid crystallizes with great facility from the chloroformic solution obtained by the usual shaking-out process. Scopolamine has not been found by the author (in the seed capsules, the only portion so far examined for its presence), but from the mother liquor he isolated small quantities of atropine. While the before-named authors, who probably operated upon the fresh leaves, obtained only 0.1 per cent. of hyoscyamine, the author determined by C. C. Keller's method the following percentages in the different materials in the dried condition: Seed capsules and seed, 1.34 per cent.; leaves, 1.393 per cent.; axils, 0.569 per cent.; roots, 0.77 per cent. The hyoscyamine being present in such abundance, and isolated so easily in a pure condition, it seems that *hyoscyamus muticus* should afford an excellent material for the further study of this alkaloid.—Arch. d. Pharm., 1898, *236*, No. 9, 704.

Hyoscine—Individuality and Presence in Datura Alba.—In continuation of his controversy with E. Schmidt, who disputes the individuality of hyoscine, $C_{17}H_{21}NO_4$, maintaining that this composition is attributable to the alkaloid scopolamine, and that hyoscine is essentially isomeric with hyoscyamine and atropine — $C_{17}H_{23}NO_3$ — O. Hesse reports upon further investigations of *datura alba* and of hyoscine, which lead him to the following conclusions: (1) The flowers of datura alba contain considerable quantities of hyoscine. (2) This alkaloid has the composition corresponding to the formula $C_{17}H_{21}NO_4$, and is the same as that of hyoscine obtained from hyoscyamus. (3) The alkaloid is amorphous and easily soluble in cold water. (4) It suffers no change when separated by means of potassium carbonate. (5) It cannot be converted into atroscin either

by the action of moist oxide of silver, or by soda solution. Schmidt had declared the atroscin of Hesse to be identical with inactive scopolamine.—Apoth. Ztg., Feb. 4, 1899, 67; from Liebig's Ann. Chem., 1898, *303*, 149.

Solanine—Preparation and Characters of the Pure Base.—P. Cazeneuve and P. Breteau, believing that the difference in the composition of the solanine obtained by previous workers is due to the decomposition of the alkaloid through defective methods of extraction, have obtained what they consider pure solanine as follows: Potato shoots, not exceeding 10 Cm. in length, were bruised with half their weight of slaked lime, and the mass, after having been dried in the air, was extracted with cold 90 per cent. alcohol. The alcohol was distilled off *in vacuo*, and the crystals which separated were washed with petroleum ether and ether, and then recrystallized from alcohol. In this way about 0.1 per cent. of light, absolutely colorless, silky needles were obtained, which were barely alkaline to litmus, melted at 250° C., and had a composition corresponding to the formula $C_{28}H_{47}NO_{10}.2H_2O$. When hydrolysed with hydrochloric acid, it splits up into

Solanidine, a crystalline body, soluble in ether and melting at 190° C., and a reducing sugar. The solanines previously described give intense color reactions with sulphuric, hydrochloric and nitric acids. The pure solanine obtained by the authors gives the faintest yellow color with sulphuric acid, a colorless solution with nitric acid, which slowly develops a faint rose tint, and is dissolved without color in hydrochloric acid.—Pharm. Journ., May 27, 1899, 483; from Compt. rend., cxxviii., 887.

Solanine.—Occurrence and identification in several Chilian species of *solanum*, which see under "Materia Medica."

Emetine and Cephaeline—Molecular Formulas, etc.—In a former paper Drs. B. H. Paul and A. J. Cownley had given as the result of analytical data obtained, the empirical formula of $C_{15}H_{22}NO_2$ to emetine, and $C_{14}H_{20}NO_2$. to cephaeline. They have since supplied Dr. O. Hesse with a sufficient quantity of these two alkaloids, obtained on a large manufacturing scale, for the purpose of making a chemical examination, and he has now reported his results, which in the main agree with those obtained by the authors before mentioned. He, however, assigns a slightly different formula to the two alkaloids, viz.: $C_{30}H_{42}N_2O_4$ for emetine, and $C_{28}H_{38}N_2O_4$ for cephaeline, in which the figures are increased two-fold, thus doubling the molecular weights, while differing in each case by one atom of hydrogen from the formula assigned by Paul and Cownley, or two atoms for the molecule of Hesse. In their present paper Messrs. Paul and Cownley call attention to these results of Hesse, and to the fact that the analytical data of Hesse agree so closely with their own —which are given in parallel—that they see no reason for accepting Hesse's formulas as being correct, the more particularly since his figures are more in accordance with their own formulas than with the formulas

which he suggests for the two alkaloids. The authors, furthermore, call attention to

Emetine Hydrobromide, which has been introduced by Messrs. Whiffen as the most suitable salt of emetine for medicinal and pharmaceutical use. A sample of the commercial salt supplied to them gave on analysis figures which correspond with the formula $C_{15}H_{22}NO_2.HBr.2H_2O$. They find, however, that when freshly crystallized it contains 9 Mol. H_2O, and that it effloresces in the air until it loses all but the 2 mol. H_2O, given in the formula; while, upon testing the salt at 100° C. it became anhydrous, viz., $C_{15}H_{22}NO_2.HBr$. The commercial hydrobromide is permanent, readily soluble in water, but less so than the hydrochloride. It is, with difficulty, soluble in absolute alcohol or in chloroform.—Pharm. Journ., July 30, 1898. 98–100.

Emetine Octoiodide—Conditions of Formation, Properties, etc.—H. M. Gordin and A. B. Prescott in the course of their researches on the estimation of alkaloids as periodides (which see) found that emetine apparently forms two periodides, according to whether the iodine is added to the alkaloids, or *vice versa*. They have isolated one of them, the higher periodide, which seems to be emetine hydriodide heptaiodide, $C_{28}H_{40}N_2O_5.HI.I_7$, or "emetine octoiodide," the formula for emetine being that of Lefort and Wurz. It was obtained by fusing 200 Cc. of solution of emetine in acidulated water, containing about ½ per cent. of alkaloid, into about 500 Cc. of solution of iodine, containing 1 per cent. of the iodine and 1½ per cent. of potassium iodide. It was obtained as a dark brown powder, scarcely soluble in benzol, ether or chloroform, but quite soluble in alcohol, and very soluble in a mixture of 4 parts of alcohol and 1 of chloroform. Crystals were not obtained.—Amer. Jour. Pharm., Jan., 1899, 20–21.

Buxine—Not Identical with Bebeerine.—M. Scholz, having in a previous investigation determined the identity of the *pelosine* isolated from *botryopris platiphyllos*, St. Hil., and of the *bebeerine* obtained from *nectandra rodiaci*, now declares that the *buxine* obtained from *buxus sempervirens* is not identical with bebeerine, as has been supposed. He has succeeded in preparing pure bebeerine by extracting the commercial base with methyl alcohol in a crystalline condition, this being a modification or form in which it has hitherto not been known. The crystals of

Bebeerine, so obtained, melt at 214° and are soluble in chloroform and in acetone; but on evaporating these solutions, the bebeerine again assumes the amorphous condition, and has a lower melting point. The composition of bebeerine is $C_{18}H_{21}NO_3$. The author has prepared the acetyl and benzoyl derivatives, and the iodomethylate of bebeerine, and has studied the products of its reduction by hydrogen, as well as those of its oxidation by permanganate, and their characters. Buxine does not possess the property of crystallizing from methyl alcohol, and is on this ground

regarded not to be identical with bebeerine.—Arch d. Pharm., 1898, No. 7.—Apoth. Ztg., Dec. 21, 1898, 889.

Corydaldine—A Product of the Oxidation of Corydaline.—James J. Dobbie and Alexander Lander give the results of their investigation of corydaldine—$C_9H_7NO(OCH)_3$—one of the substances obtained by the oxidation of corydaline by means of potassium permanganate. Corydaldine readily dissolves in water, melts at 175°, and contains two methyl groups. Dissolved in hydrochloric acid and treated with sodium nitrite at 0°, a yellow nitroso-derivative is obtained, melting at 185°, which is very insoluble in hot or cold water. When this is gently warmed with a solution of sodium hydrate, nitrogen is evolved, and on addition of hydrochloric acid to the solution a new substance, melting at 138°–139°, is obtained, which is the anhydride of a monobasic acid. This acid has the composition $C_{11}H_{12}O_4$; it is difficultly soluble in cold water, but readily in boiling water, from which it crystallizes well on cooling. Oxidation with permanganate at 100° converts it into metahemipinic acid. The authors' experiments prove *corydaline* to be closely related to berberine, hydrastine, narcotine, and papaverine, in common with which it contains an isoquinoline nucleus.—Chem. News, May 26, 1899, 260.

Staphisagroine—A New Alkaloid from Stavesacre Seeds.—Felix B. Ahrens has obtained from the residues of the seeds of *delphinium staphisagria*, from which the four known alkaloids—delphinine, delphinoidine, delphisine, and staphisagrine—had been separated, a fifth and new alkaloid, which he has named "staphisagroine." The four first named alkaloids are separated during the process by virtue of their solubility in chloroform, whereas the staphisagroine, being insoluble in chloroform, remains in the residue, from which it was separated (by dilute acid ? Rep.), and obtained in form of a yellowish amorphous powder. Upon further purification, it was obtained nearly white. It has the empirical formula $C_{20}H_{24}NO_4$, melts at 275°–277°, and is nearly insoluble in all the usual solvents, but readily dissolved by diluted hydrochloric acid, and from this solution again precipitated by ammonia. Staphisagroine gives none of the color reactions that are characteristic of the older delphinium alkaloids. The picrate, and the gold and platinum double salts have been prepared. Attempts to separate the alkaloid from its platinum double compound resulted in the formation of a new base.

Staphisagroidine, $C_{20}H_{20}NO_2$. This is a brownish powder, melting at 185°, and is evidently produced by the abstraction of 2 mol. H_2O from the original base. The gold double salt has been prepared from its solution in hydrochloric acid.—Apoth. Ztg., June 17, 1899, 361; from Berichte, 1899, 1581.

Nicotine—Demonstration of its Presence in Tobacco Smoke.—Kissling demonstrates the presence of nicotine in tobacco smoke in the following simple way: A bottle half full of water rendered faintly acid with sulphuric

acid is provided with two tubes, passing through the stopper, one dipping into the water and having a cigar inserted in its outer end, the other just passing through the stopper, and serving the purpose of a mouth-piece for drawing the smoke as in the ordinary way of smoking. After the cigar has been partly consumed, the liquid is tested with Mayer's reagent, by which a copious precipitate is produced in the presence of nicotine. The presence of nicotine may also be shown by rendering the solution alkaline with soda and distilling. In the author's experience tobacco smoke contains a relatively large proportion of nicotine, and never more than a very small percentage of a picoline base.—Pharm. Journ., Dec. 24, 1898, 665; from Chem. Ztg., lxxxviii., 805.

Salicylate of Nicotine—A New Remedial Compound.—The firm of L. C. Marquart has introduced salicylate of nicotine, $C_{10}H_{14}N_2.C_7H_6O_3$, as a new remedial agent under the trade name of

Eudermol.—This forms colorless transparent crystals, which are easily soluble in water and most of the organic solvents and have a faint empyreumatic odor. It melts at 118°. It is recommended by Dr. Wolters as a specific in scabies, for which it is best employed in form of salve made with lanolin or vaselin, but not exceeding a strength of 0.1 per cent. eudermol. —Pharm. Ztg., Sept. 17, 1898, 667; from Therap. Monatsh., No. 8, 1898.

Coniine—Solubility in Carbon Disulphide.—It is stated in the current text-books, on the authority of Blyth, that coniine is sparingly soluble in carbon disulphide, a statement which has not been contradicted during the past 39 years. H. Melzer finds that this statement is in so far correct that solution does not take place at all, since the coniine, being a secondary base, unites with carbon disulphide direct, forming under evolution of heat

Coniylthiocarbaminate of Coniine, $C_8H_{16}N.CS.HS.NC_8H_{17}$. This compound remains when the excess of carbon disulphide is removed by evaporation. A glassy, viscid mass remains, which gradually congeals in the exsiccator to form a colorless crystalline mass. Recrystallized from petroleum ether it is obtained in the form of feathery crystalline needles, having faintly the odor of coniine, which are easily soluble in nearly all of the organic solvents.—Arch. d. Phar., 1898, *236*, No. 9, 701–703.

Toxic Ptomaines—Source in Preserved Meats.—It is stated by Van Ermenglin that the toxic ptomaines sometimes found in preserved meats are due to a specific organism, *bacillus bolulinus.* This secretes a soluble toxin, which the author has called

Boluline, and which is stated to be so intensely toxic that the one-thousandth part of a milligramme killed a rabbit in twenty-four hours. Fortunately this ptomaine is destroyed at a temperature of 60°–70° C., and the bacillus which produces it at 85° C., so that thorough cooking

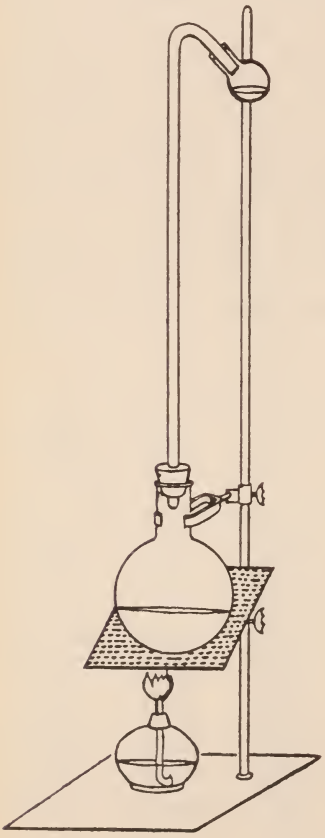
will remove all dangers in the case of salted or smoked meats.—Pharm. Journ., Aug. 20, 1898, 217; from Journ. de Pharm. et Chem. (6), ix., 88.

Exalgin, Acetanilid and Similar Antipyretics—Volatility.—In a former paper Prof. Moerck had recorded his observations concerning the volatility of certain of the newer remedies. He had found that exalgin and acetanilid volatilize between 40° and 50° C.; methacetin and phenacetin at 100° C. He has since continued his researches in this direction, including also lactophenin, and has obtained some interesting results. The experiments were made by heating the substances placed in watch crystals in a water-oven, the opening in which for the escape of volatile products was closed by a cork carrying a glass tube about 6 inches long and ½ inch in diameter, through which the thermometer was introduced; this tube enabled the detection of sublimates. One-half gramme each of exalgin, acetanilid, methacetin, phenacetin and lactophenin were placed in weighed watch-crystals 2½ inches in diameter, and heated in the water-oven for the specified time; the temperatures represent respectively initial and final readings for the experiment when two are stated; after cooling in a desiccator and weighing, the weight of the watch-crystal was subtracted, giving the weight of the powder at the end of each experiment; the difference between two successive weighings will give the loss sustained in heating for the stated period and at the stated temperature. It will be noticed that in some cases there is an increase in weight, which is probably accounted for by the absorption of some of the more volatile substances by the less volatile. The results are tabulated in the order in which the experiments were made, as follows:

Temperature and Length of Time of Heating.	Exalgin. 100° C. (m. p.)	Acetanilid, 113°–114°C (m. p.)	Methacetin, 127° C. (m. p.)	Phenacetin, 135° C. (m. p.)	Lacto-phenin, 116°–117° C. (?)
48°– 55° C., 3 hrs.	0.4930	0.4980	0.5000	0.4995	0.4990
55°– 46° C., 7 "	0.4825	0.4995	0.5010	0.5005	0.5005
48°– 46° C., 10 "	0.4735	0.4985	0.5010	0.5000	0.4995
62°– 68° C., 7 "	0.4235	0.4965	0.5000	0.5000	0.4995
66°– 85° C., 5 "	0.2830	0.4890	0.5000	0.5000	0.5005
80°– 85° C., 4 "	0.1890	0.4795	0.4995	0.4990	0.5000
90° C., 4 "	discontin'd	0.4685	0.4980	0.4980	0.4990
85° C., 2 "	—	0.4635	0.4985	0.4985	0.4995
90°– 92° C., 3 "	—	0.4490	0.4970	0.4960	0.4985
95°– 97° C., 5 "	—	0.4315	0.4955	0.4955	0.4990
85°– 90° C., 2 "	—	0.4275	0.4955	0.4955	0.4990
98°–100° C., 4 "	—	discontin'd	0.4930	0.4935	0.4985
98°–100° C., 6 "	—	—	0.4915	0.4930	0.4980
98°–100° C., 9 "	—	—	0.4885	0.4910	0.4985
98°–100° C., 5 "	—	—	0.4870	0.4895	0.4975
98°–100° C., 6 "	—	—	0.4850	—	—
98°–100° C., 5 "	—	—	discontin'd	0.4880	—
98°–100° C., 7 "	—	—	—	discontin'd	0.4970
98°–100° C., 6 "	—	—	—	—	0.4960

It will be noted that exalgin, acetanilid, methacetin and phenacetin are soluble in the order given, which corresponds also to the order of the melting point (that of lactophenin being determined by the author without correction); the decided difference between these four and lactophenin is no doubt chiefly due to the fact that the first four contain the acetyl group, while lactophenin contains the lactyl group. The importance of these observations is chiefly in connection with the solubilities and quantitative estimation of these substances, the heating to complete dryness affecting the results in accordance with their greater or less solubility, since in quantitative estimations drying is a necessary operation. The difference in the behavior of acetanilid and of methacetin, and phenacetin and lactophenin at temperatures below 85° C., suggested the possibility of detecting acetanilid in these other remedies, and experiments made by the author seem to point out such utility.—Proc. Pa. Pharm. Assoc., 1898, 111–115.

FIG. 69.



Acetanilid—Preparation by the Pharmacist.—Leon Laizer Walters contends that acetanilid can be made by the pharmacist more economically than it can be bought, and he communicates the method for its preparation in moderate quantities, together with the simple apparatus necessary. A glass flask of about 250 Cc. capacity is fitted with a good stopper bored so as to carry a glass tube about 1 meter long and six to eight millimeters diameter snugly, as shown by Fig. 69. The outer extremity of this tube is bent over as shown, and leads into the neck of a small flask or wide-mouthed bottle, which may be held in place by simply tying, or by means of a ring. Fifty grammes each of aniline and glacial acetic acid having been placed into the flask, the stopper carrying the condensing tube is securely inserted, and heat is applied gently by means of an alcohol flame or a Bunsen burner, a sheet of wire gauze intervening between the flame and flask. The *rationale* of the method is simple: acetanilid is produced by the continued action of concentrated acetic acid on aniline with elimination of water; during the process of boiling, vapors both of water and acetic acid are given off. Acetic acid, having a higher

boiling point, returns to the flask, while the water passes into the flask above and is there condensed, or passes into the air as vapor. In this way the acid remains sufficiently strong to eventually convert all the aniline into acetanilid. If the heat is so regulated that gentle even boiling ensues, the process can be left to go on by itself, and is completed in from 5 to 6 hours. The contents of the flask are then, while still warm, poured in a thin stream into a liter of water, stirring the water continually, and the separated acetanilid is purified by several recrystallizations from boiling water, it being quite insoluble in cold water. It is then easily obtained in the form of large leaflets of extreme beauty and purity.—Bull. Pharm., Febr., 1899, 53–54.

Phenazone—Contamination with Aniline Red.—A. J. Dey, since the lapse of the patent for phenazone (antipyrine) has had occasion to examine several commercial samples. In the case of one sample he found, when placing it in water, here and there minute red spots, and that though apparently otherwise of good quality, the melting point was 110° C., instead of 113° C., the latter being in accordance with the B. P., 1898, while the lower temperature is in accord with the requirement of the B. P., 1885. Subsequent examinations proved the red spots to be due to fuchsin or rosaniline hydrochloride. The author calls attention to this with the view to pointing out the necessity of examining this and other synthetic remedies after the patent for them has expired. During the currency of a patent monopoly one may, he thinks, usually rely on the reputation and ability of the patentee, but after that a great many new makers appear, and their product may not always be up to the standard.—Pharm. Journ., Jan. 21, 1899, 59.

Antipyrine Tannate—Preparation and Characters.—A. Sztánkay prepares tannate of antipyrine as follows: 3.2 Gm. antipyrine and 1.88 Gm. annin are separately dissolved, each in 10 Cc. of water, the solutions mixed, the resulting curdy precipitate collected on a filter and dried. A yellowish tasteless powder is then obtained, which is insoluble in water, but decomposed by acids into its constituents. It contains 37 per cent. of antipyrine and 67 per cent. of tannin, its composition being given by the authors as $C_{11}H_{12}N_2O.C_{14}H_{10}O_2$.—Pharm. Ztg., Sept. 17, 1898, 667.

Phenacetin—Unreliability of the B. P. 1898 Test for its Distinction from Acetanilid.—Bertram Cockburn calls attention to the unreliability of the carbylamine test by which, according to the British Pharmacopœia, 1898, the presence of acetanilid is detected in phenacetin. According to this test, "a mixture of 5 grains of phenacetin with 2 fluid drachms of solution of potash boiled should yield no unpleasant odor when again boiled after the addition of 5 drops of chloroform." It has, however, been shown by E. Ritsert that after prolonged boiling phenacetin also furnishes phenyl-carbylamine under the conditions of this test, and this has been confirmed by the author in experiments with three samples of phen-

acetin. The reaction, therefore, as a test to distinguish between these two substances, is unreliable. It should be mentioned that in the British Pharmacopœia, 1898, the test is mentioned under acetanilid and not under phenacetin.—Pharm. Journ., April 22, 1899, 367.

Phenacetin—Local Use in Rheumatic Affections.—It is stated that phenacetin may with advantage be used locally in rheumatic affections, either in the form of salve—phenacetin, 5.0; lanolin, 20.0; olive oil, q. s. —or in the form of fomentations, composed of phenacetin, 5.0, alcohol, 1 liter, applied as hot as possible.—Klin. Ther. Wochenschr., 1899, 186.

Alkaloidal Guaiacol-Sulphonates—Preparation.—The following particulars concerning a new series of compounds of guaiacol with certain alkaloids are given in "Pharm. Ztg." (Sept. 17, 1898, 667): Guaiacolsulphonic acid is prepared by heating guaiacol with sulphuric acid upon a water bath, diluting the acid compound with water, converting it into an alkali or alkaline-earth salt, and liberating from this the pure guaiacol-sulphonic acid by means of a suitable mineral acid. The pure acid, suitably diluted, is then combined with quinine, cinchonine, etc., using 1 mol. of the alkaloid to make the neutral, or ½ mol. to make an acid salt. These alkaloidal compounds may also be prepared by double decomposition between a metallic salt of the guaiacol-sulphonic acid and a salt of the derived alkaloid. The quinine compound is the familiarly known

Guaiaquin, which combines the antipyretic properties of quinine with the antiseptic and antifebric properties of guaiacol. Being free from the unpleasant odor and caustic action of guaiacol, this new series of compounds, which are prepared under a patent issued to G. L. Schaefer, are believed to find extended medicinal application.

Tannate of Orexine—Remedial Value.—Dr. F. Siegert has found tannate of orexine to give good results in cases of loss of appetite of children in the reconvalescent stages after acute illness, nervousness, etc. The remedy is given an hour or two before meals, in doses of 0.25 to 0.5 Gm., its beneficial effects usually manifesting themselves after 5 or 6 days use. It may be given in form of chocolate tablets, but is more effective in powder, in which form it may be administered either with milk or wine.—Apoth. Ztg., May 27, 1899, 314; from Münch. Med. Wochenschr., 1899, 655.

Acet-p-Sulphanilate of Sodium—Historical Review, Characters and Therapeutic Value.—Geo. W. Funck reviews the history, method of formation and preparation, and the physical, chemical, and therapeutic properties of acet-p-sulphanilate of sodium, discovered by Nietzky in 1884, and introduced into modern medicine under the name of

Cosaprine in 1897 by P. Schwarz. On account of its ready solubility in water, its comparative freedom from untoward secondary effects, this substance is recommended as an efficient and safe substitute for antifebrin.

A bibliography up to the most recent date is appended to the author's paper.—Pharm. Review, June, 1899, 249–254.

Nirvanin—A New Anæsthetic Compound.—Drs. Einhorn and Heinz have, in conjunction with Max Oppenheimer, succeeded in preparing a new synthetic compound possessing anæsthetic properties, which is devoid of the respective disadvantages of orthoform and cocaine. The insolubility of orthoform operates to counteract its power of producing complete and long-continued anæsthesia, while the acid character of its hydrochloride renders the solution of that salt unfit for hypodermic use. The author found the alkyl derivatives of glycocoll compounds, especially the

Hydrochloride of Diethyl Glycocoll-p-amido-o-oxybenzoic Methyl Ester, which, for the sake of brevity, they have named "nirvanin" to be the most suitable substance to replace the two bodies mentioned. This salt crystallizes from absolute alcohol in white prisms melting at 185° C. It is readily soluble in water, producing a neutral solution, and gives a violet coloration with ferric chloride. A 5 per cent. solution dropped into the eye produces, after some time, perfect anæsthesia. The conjunctiva is temporarily irritated by it. On a less sensitive mucous membrane a 5 per cent. solution does not cause irritation, but the anæsthesia produced is not sufficient to admit of painless operation. Being only slightly toxic, this compound resembles orthoform in this respect, and as compared with known soluble anæsthetics, it is a relatively harmless substance, being only one-tenth as poisonous as cocaine, so that as much as 7 grains may be injected without injury. Other advantages over cocaine are found in its long-continued effect, and in its powerful antiseptic action—a 1 per cent. solution destroying all bacterial growth.—Münch. Med. Wochenschr., *45*, 1553.

Artificial Musk—Chemical Production.—The most recent chemical products that possess the odor of musk are introduced by a chemical manufacturing firm of Thaun in Elsass. They are respectively

Dinitrobutyltolylazoimid, melting at 146° C., and the

Dinitrobutylxylylazoimid, melting at 89° C. Both of these compounds are prepared by a patented process, which consists in diazotizing dinitrobutyltoluidin and dinitrobutylxylidin respectively, converting the products into perbromides, and treatment with ammonia.—Pharm. Centralh., Dec. 1, 1898, 871.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Digitalis Glucosides—Characters of Distinction, etc.—Kiliani communicates the results of further investigations concerning the characters of distinction and chemical constitution of the digitalis glucosides. Carefully conducted experiments show that in the splitting up of

Digitoxin no other sugar than digitoxose is produced; that the compo-

sition of the glucoside may with certainty be represented by the formula $C_{34}H_{54}O_{11}$, instead of $C_{31}H_{50}O_{10}$; that the uncertainty heretofore existing with regard to the formula of digitoxose is now removed and is undoubtedly $C_6H_{12}O_4$; and that the formula $C_{22}H_{32}O_4$, already assigned to digitoxigenin, certainly represents its composition. He finds that in the splitting up of digitoxin two molecules of digitoxose are produced, thus: $C_{34}H_{54}O_{11}+H_2O = C_{22}H_{32}O_4 + 2C_6H_{12}O_4$. With regard to

Digitalin, the author's results point out that the products of its splitting up are digitaligenin, $C_{22}H_{30}O_3$, *d*-glucose, $C_6H_{12}O_6$, and digitalose, $C_7H_{14}O_5$. The molecular weight determinations had led him to the conclusion that the heretofore accepted formula for digitaligenin, $C_{16}H_{22}O_3$, must be changed to $C_{22}H_{30}O_3$ or $C_{23}H_{32}O_3$. Accepting the formula $C_{22}H_{30}O_3$ as the correct one for the digitaligenin, and in conformity with the molecular composition of the sugars, the formula for digitalin must also be changed. He suggests the formula $C_{35}H_{56}O_{14}$, which agrees well with the analytical data obtained by himself and Schmiedeberg, so that the splitting up of digitalin might be represented by the simple equation: $C_{35}H_{56}O_{14}$ (Digitalin) $= C_{22}H_{30}O_3$ (Digitaligenin) $+ C_6H_{12}O_6$ (*d*-Glucose) $+ C_7H_{14}O_5$ (Digitalose). With regard to Nativelle digitalin,

"*Digitaline Cristallisée*," the author had on a previous occasion disputed the view held by Adrian that it was identical with the German "digitoxin," and had, in fact, expressed a doubt as to the individuality of the French preparation. He had now become convinced of the chemical individuality of "digitaline cristallisée," prepared by Adrian & Co., and has obtained, by the splitting up of this preparation, products which are apparently the same as those yielded in the same way, by digitoxin. The identity of the sugar product with digitoxose has been ascertained with certainty, and while some uncertainty remains with regard to the other product of splitting up, the close relationship of the French preparation to digitoxin cannot longer be doubted.—Ber. d. d. Chem. Ges., xxxi., 2454.

Strophanthin—Properties.—Kohn and Kalish have studied the properties of strophanthin isolated from the seeds of *strophanthus hispidus*, Kombé. Accepting the formula $C_{38}H_{58}O_{15}$, they found their product very hygroscopic, and agreeing in this respect with a preparation obtained from Merck. By heating the strophanthin with diluted hydrochloric acid it is hydrolysed, but no sugar is obtained as a product of the hydrolysis. Strophanthin is therefore not a glucoside. The product of the hydrolysis,

Strophanthidin, to which the authors assign the formula $C_{26}H_{38}O_7 + \frac{1}{2}H_2O$, crystallizes from hot alcohol in handsome, fine needles, which are united so as to form extremely light, silky-glistening leaflets. Although not soluble in water, strophanthidin has been found to be extremely hygroscopic.—Apoth. Ztg., Dec. 21, 1898, 889; from Monatsh. f. Chem., 1898, 19, 385.

Strophanthin—Quick Method of Determination in the Tincture and Extract by Means of the Polariscope.—Edwin Dowzard recommends the following quick method for estimating the amount of strophanthin in the tincture or extract: 100 Cc. of *tincture* are evaporated to about 20 Cc. on a water bath, 2 Cc. of a solution of basic lead acetate are added, the heat continued a few minutes, the mixture filtered, and the precipitate washed twice with warm water. The filtrate and washings are evaporated to about 10 Cc., then made up to exactly 20 Cc., and a portion of this is passed through a dry filter and its optical rotation taken in a 200 Mm. tube, using an instrument of the Laurent half-shadow type. On dividing the rotation by five that of the original tincture is obtained; one minute being equivalent to .03 grammes of strophanthin per 100 Cc. of the liquid examined. In the case of *extract* the procedure is essentially the same. The estimation must be made however before its reduction with milk sugar, as is required when making the B. P. extract—1 gramme of the extract being dissolved in 5 Cc. of warm water, and then treated with basic lead acetate, etc., as in the case of the tincture.—Proc. Brit. Pharm. Conf., 1898, 358–359.

Aloin—Chemistry.—O. A. Oesterle has made a comprehensive study of the chemical nature of aloin, and sums up the results of his observations as follows: 1. By the action of hydrochloric acid upon aloin in alcoholic solution *aloe-emodin* is formed. The splitting off of sugar during this process could not be determined. The body which Rochleder regarded as being identical with rottlerin is in reality aloe-emodin. 2. By oxidation with a chromic acid mixture aloin yields products from which a well crystalized body can be separated; the composition of this body is, however, not that of a tetraoxymethylanthraqinone. 3. The question of analogy between *alochrysin* and *aloe-emodin*, and between the latter and the *alonigrin* of Tschirch and Pedersèn remains undetermined, and will be the subject of further study by the author.—Arch. d. Pharm. (1899), *237*, No. 2, 81–92.

Barbaloin—Characters and Derivatives.—E. Leger, in continuation of his studies upon the aloins, reports upon his studies concerning the characters and derivatives of barbaloin. He finds that the addition of bromine water to an aqueous solution of barbaloin produces a yellow, non-crystallizable precipitate, which is readily soluble in alcohol. When a solution of barbaloin in concentrated hydrochloric acid is treated with potassium chlorate,

Trichlorbarbaloin, $C_{16}H_{13}Cl_3H_7 + H_2O$, is formed. The product of the reaction becomes dark at first, gradually changes to orange red, and congeals in the course of a day to a crystalline magma, which is washed, and then recrystallized from alcohol. It forms clinorhombic, lemon-yellow crystals, sparingly soluble in alcohol, nearly insoluble in water, but readily soluble—and in this distinct from barbaloin—in cold soda solution. The

author prepared from trichlorbarbaloin the acetyl and benzoyl derivatives, the result leading to the conclusion that barbaloin contains three hydroxyl groups, which, in all probability, partake of the character of phenols.

Triacetyltrichlorbarbaloin, $C_{16}H_{10}Cl_3(C_2H_3O)_3O_7$, forms microscopic, rhomboidal, extremely thin leaflets, which are sparingly soluble even in hot alcohol.

Tribenzoyltrichlorbarbaloin, $C_{16}H_{10}Cl_3(C_7H_5O)_3O_7$, is amorphous, nearly insoluble in alcohol, but easily dissolved by aceton. A companion of barbaloin in Barbadoes aloes is

Isobarbaloin, which may be obtained from the last portions resulting from the barbaloin crystallization. Crystallized from methyl alcohol it forms opaque warty aggregations of microscopic leaflets, which contain 3 mol. H_2O, but effloresce easily. The substance is sparingly soluble in cold water, more abundantly in hot water, and crystallizes from the hot watery solution in form of prismatic needles, paler in color than barbaloin, and containing 2 mol. H_2O. Several derivatives were prepared and described by the author.

Trichlorisobarbaloin, $C_{16}H_{13}Cl_3O_7+4H_2O$, crystallizes from alcohol in prismatic, yellow, glistening needles.

Tribromisobarbaloin was also obtained. This is identical with the tribrombarbalcin previously obtained and described by the author.

In three samples of Barbadoes aloes, the amount of isobarbaloin was only from 4 to 5 per cent., but this small percentage need not therefore be regarded as the rule.—Apoth. Ztg., Dec. 21, 1898, 889; from Compt. rend., cxxvii., 234–236.

Oxymethylanthraquinones—Their Significance for Certain Organic Cathartics.—The observation of G. Pederson that the substance which causes Borntraeger's aloetin reaction is an emodin (*trioxymethylanthraquinone*) which has the formula $C_{15}H_{10}O_5$, has been extended by Prof. Tschirch to other cathartic substances. He reports that chrysophanic acid (*dioxymethylanthraquinone*), morindon (an isomer of emodin) and aloexanthin (*tetramethylanthraquinone*) likewise give this reaction, which the author prefers to call the *oxymethylanthraquinone* reaction. According to a modification of Borntraeger's method, whereby the drug is boiled, the filtrate shaken with benzol, and the benzol solution shaken with ammonia, the last turning red, the following drugs gave the oxymethylanthraquinone reaction: Several species of rhubarb and aloes, rumex, buckthorn bark and berries, cascara, Alexandria aud Tinevelly senna, Morinda and Parmelia. Natal aloes does not give it, nor does turmeric or nutgalls, although the last two are often stated to do so. An alcoholic extract of nutgalls, however, gives the reaction. All the drugs that give the reaction are decided cathartics. Commercial aloins contain emodin. This can be removed by extracting the dry aloins with anhydrous ether in

which aloin is insoluble. Purified aloin deprived of emodin is but faintly yellow. Barbaloin crystallizes from water and alcohol with three molecules of water of crystallization and is very hygroscopic. It is only after prolonged heating at 100°–110° in a stream of hydrogen that the anhydrous barbaloin can be obtained. The analysis agrees very well with Groenewald's formula $C_{16}H_{16}O_7$. Emodin can be easily obtained from barbaloin by passing air, deprived of carbon dioxide, into a 1 per cent. potassium hydrate solution of barbaloin, acidifying with sulphuric acid and shaking out with benzol. The benzol solution is shaken with ammonia water and the emodin precipitated with hydrochloric acid and recrystallized from alcohol. Emodin so prepared melts at 211°. This formation Tschirch figures as follows:

$$\underset{\text{Barbaloin}}{C_{16}H_{16}O_7} + O_2 = \underset{\text{Emodin}}{C_{15}H_{10}O_5} + 3H_2O + CO_2.$$

Tschirch shows that extracts of rhubarb, aloes, senna and frangula, deprived of oxymethylanthraquinones, will after boiling with dilute sulphuric acid again yield considerable quantities of oxymethylanthraquinones. Natal aloes does not. This shows the presence in these drugs of substances of a possible glucosidal nature, which upon hydrolysis yield one of the oxymethylanthraquinones.

Physiological experiments show that all the aloes except Natal aloes, which does not split up into an oxymethylanthraquinone, are active cathartics, likewise rhubarb, senna and frangula. The oxymethylanthraquinones are physiologically active, and Tschirch believes that the action of the above groups of cathartics depends upon these compounds. It does not depend entirely upon the oxymethylanthraquinones preformed in the drugs, but rather upon their formation, by oxidation or hydrolysis, in the intestinal tract from compounds which can yield them. From an experiment with emodin-free aloin upon a guinea pig it appears that there is not an immediate peristaltic action of the intestines, whereas contractions are almost immediate when emodin is administered.—Pharm. Review, Jan., 1899, 29; from Ber. d. d. Pharm. Ges., *8*, 174–209.

Picrotoxin—Composite Character of the Commercial Product.—The picrotoxin of commerce, which is supplied in form of white, glistening, rhombic prisms, and is prepared from the seeds of the fruits of *menispermum cocculus*, has been the subject of investigation by Meyer and Bruger, who find that it is not, as has been heretofore assumed, a single body, but that it is composed of two distinct substances which appear to have the property of crystallizing together—namely about 54 to 55 per cent. picrotoxin and 45 to 46 per cent. picrotin.

Picrotoxinin, $C_{15}H_{16}O_6$, crystallizes in the cold with 1 mol. H_2O; from hot solution in anhydrous condition. It is readily soluble with the aid of heat in all the ordinary solvents, and also in cold alcohol and chloroform.

The aqueous solution reduces ammoniacal silver solutions in the cold, whilst Fehling's solution is reduced with the aid of heat. By the action of chlorine on the hot aqueous solution,

Chlorpicrotoxin, $C_{15}H_{15}ClO_6$, is readily obtained in the form of firm, needle-shaped crystals. The bromine and iodine derivatives are also easily obtained. The separation of

Picrotin, $C_{15}H_{18}O_7$ may be accomplished by taking advantage of the solubility of picrotoxinin and the insolubility of picrotin in benzol or chloroform, but the method is tedious. A better method consists in treating the aqueous solution of the commercial picrotoxin with bromine, which produces brom-picrotoxinin, but does not act upon the picrotin. The brom-picrotoxinin crystallizes out on cooling, and the picrotin may then easily be separated from the residual solution. Picrotin crystallizes from its solution in boiling water in the form of delicate white needles forming felty aggregations; from dilute aqueous solutions it is obtained in thick, glistening prisms. Attempts to convert the picrotin into picrotoxinin by the abstraction of 1 mol. of water $= C_{15}H_{18}O_7 = H_2O + C_{15}H_{16}O_6$—have been unsuccessful.—Apoth. Ztg., Feb. 4, 1899, 67; from Berichte, 1898, 31, 2958.

Santonin—Bibliography.—A. Van Zwaluwenberg communicates a bibliography of santonin, with abstracts of methods of production, covering the entire period since its discovery by Kahler in 1830, to the last paper communicated by H. Vogel in 1897, on the toxic action of santoxin. This bibliography will doubtless be found a great convenience to investigators, and may be referred to in Pharm. Archiv., January, 1899, 1–11.

Calcium Santonate—Characters and Value as a Vermifuge.—Bombelen calls attention to the therapeutic value of calcium santonate. It is a white, tasteless, insoluble powder, obtained by saturating santonin with milk of lime while heating, and drying the product obtained. By reason of its insolubility and consequent slowness in being absorbed, it is, in the opinion of the author, more efficient as a vermifuge than santonin of itself, and possesses the further advantage in being perfectly tasteless. It is, therefore, easily administered in form of confections, tablets, etc.—Apoth. Ztg., March 11, 1899, 128.

Pimpinellin—Properties.—According to Buchheim, pimpinellin, the bitter principle of *pimpinella saxifraga*, is a crystallizable body, free from nitrogen and melting at 97° C. G. Hent has now reinvestigated the properties of this body, essentially following the directions of Buchheim for its preparation. He obtained pimpinellin in the form of colorless needles, having the melting point of 100°, and corresponding in its composition with the formula $C_{14}H_{12}O_5$. It is very soluble in warm dilute solution of potassium hydrate, and dissolves in concentrated sulphuric acid with a leek-green color.—Apoth. Ztg., Sept. 7, 1898, 629; from Arch. d. Pharm., 238, No. 3 (1898).

Capsaicin — Characters and Composition. — Micko, who obtained capsaicin from the ethereal extract of the fruits of *capsicum annuum*, in the form of white crystals, melting at 63°–63.5° Cc., attributes to it the formula $C_{18}H_{28}NO_3$, while Flückiger, by overlooking the nitrogen, gave to it the formula $C_9H_{14}O_2$. The author finds capsaicin to have a slightly acid, phenolic character, and to contain a methoxy group. From the derivatives, a benzoyl derivative has been obtained. If an alcoholic solution of capsaicin is mixed with platinum chloride in excess and evaporated, a distinct odor of vanillin is noticeable, and a small quantity of platinum double salt is obtained. The author believes capsaicin to be the active principle of capsicum fruits, and considers it probable that it is identical with the capsacutin of Norbitz (see Proceedings, 1898, 800), who attributed to it the formula $C_{35}H_{54}N_2O_4$.—Pharm. Journ., Aug. 29, 1899, 383; from Chemik. Ztg., *23*, 26.

Apiol—Bibliography.—A convenient bibliography of Apiol, beginning with the paper of Joret and Homolle (1885) and concluding with the latest reference to it in Beilstein's Handbuch der Organischen Chemie (1896), has been compiled by A. Van Zwaluwenberg, and may be consulted in Pharm. Archives, February, 1899, 23–26.

Coumarin and Vanillin—Separation, Estimation and Identification in Flavoring Extracts.—Wm. H. Hess and Albert B. Prescott describe a practical method for the separation of coumarin from vanillin in commercial flavoring extracts, which is based upon the following theory: Vanillin is hydroxymethoxybenzoic aldehyde, while coumarin is the anhydride of coumaric (orthohydroxycinnamic) acid. The separation depends on the aldehydic character of vanillin. If vanillin be dissolved in pure, dry ether and dry ammonia gas passed through the solution, the aldehyde ammonia compound of vanillin will be precipitated in almost quantitative proportions. It is accordingly not very soluble in ether; but like all aldehyde ammonias it is very soluble in water. Ammonia water should, then, extract all the vanillin from an ether solution. This theoretic principle is fully borne out in practice, as has been proved by repeated experiment. Coumarin, on the other hand, remains wholly in the ether solution. For the detailed description of the method of estimating and identifying the two principles, reference must be had to the original paper in Pharm. Review, Jan., 1899, 7–9.

Vanillin—Production from Corkwood.—In the course of investigations upon the constituents of cork-wood, W. Braeutigam observed a distinct vanilla odor in the residue remaining when the cork substance was boiled with diluted sulphuric acid, the filtrate shaken out with ether, and the ether evaporated. Following up this clue, he succeeded in separating an abundance of a crystalline body, (Cerin, ? Rep., see Corkwood), which, however, appears to bear no relation to vanillin, and very small quantities of a body which possessed unmistakably the characters and gave the

reactions of true vanillin. He concludes from his observation that cork-wood contains a tannin-like body which under certain conditions is capable of splitting up into vanillin and other products of decomposition, but that vanillin does not pre-exist in the cork substance.—Pharm. Centralh., Oct., 1898, 725.

Vanillin—Examination of Commercial Samples—Lyman F. Kebler has had occasion to examine several samples of artificial vanillin with the view to determine, if possible, the reason for certain differences observed in the odor. It was suggested that these differences might be due to impurities, either left in the process of preparation or purposely added, which would be revealed by the variation in the melting points of the samples. The results of the examination are given as follows:

No.	Physical Appearance.	Color.	M.P. Corr. Degree C.	Congealing Point, Corr.	Per cent. of Vanil'n Grav.	Per cent. of Vanillin Vol.	
1	Large size cryst.	White	81.8	74	97	101.4	A lemon-yellow color was yielded by all the samples when treated with concentrated H_2SO_4 and 25 per cent. solution of Na OH.
2	Small size cryst.	Slight yellowish cast	81.8	68	96	98.4	
3	Small size cryst.	Slight yellowish cast	81	69	96	98.2	
4	Med. size cryst.	Slight yellowish cast	81.6	74	97	98.3	
5	Med. size cryst.	Decided yellowish cast	81.9	74.5	96	98.00	

It will be noted that the only deviations of convergence are in the congealing point of the several samples, but there is no information on the possible import of these differences. The conclusion arrived at is that all the samples were of fair commercial quality. Some of them may have contained a small amount of vanillic acid, which is liable to be present in small amounts, but for that reason difficult to estimate. While the method of R. Hefelmann for the estimation of vanillin, which depends upon the production of a compound of the aldehyde (vanillin) with sodium bisulphite insoluble in ether, is a good one, there are more recent methods which are better. The method of Hess and Prescott (which see), for instance, has given good results in the author's experience.—Amer. Drugg., March 25, 1899, 161–162.

Vanillin—Adulteration with Acetylisoeugenol.—Attention is drawn in Schimmel's Report (April, 1899, 68) to another form of adulterated vanillin which has recently been offered in Austria. It contains only 35.26 per cent. of vanillin, the remainder being acetylisoeugenol.

Vanillin — Adulteration with Acetanilid. — Hefelmann has found a sample of vanillin, obtained from Switzerland, to contain nearly 27 per cent. of acetanilid. Pure vanillin melts at 79°–82° C., and is readily and completely soluble in dilute soda solution; whereas the adulterated sample melted at 61° C., and is only partly soluble in soda solution. The

acetanilid was recognized by the nitrogen determination. The separation of acetanilid was accomplished by shaking the ether solution of the suspected vanillin with concentrated sodium bisulphite—which forms a double compound with vanillin—decanting the ether solution and washing it with water to remove the remainder of the double compound. On evaporation, the ether then yields the acetanilid in a condition in which it will respond to the usual tests for the pure substance.—Apoth. Ztg., 1898, No. 49.

Vanillin—Reduction of Melting Point by Acetanilid.—F. Dietze, having his attention called to an adulteration of vanillin with acetanilid and a consequent low melting point of the mixture, has experimented to determine the influence exerted by variable proportions of acetanilid upon the melting point of its mixture with vanillin. Using vanillin of m. p. 81.0° and acetanilid of m. p. 113.5°, he found a mixture of equal parts of the two to begin to melt at 62.5° and to melt completely at 87° to 88°. A mixture containing 40 per cent. of acetanilid gave the figures 62.5° and 86°; 30 per cent. acetanilid, 62° and 75.5°; 25 per cent. acetanilid, 62° and 74.5°; 20 per cent., 62.5° and 73.5°; 15 per cent., 63.5° and 75.5°; 10 per cent., 65.5° and 78°; 7 per cent., 67.5° and 78.5°; and a mixture containing 4 per cent. acetanilid began to melt at 69° and was completely melted at 79.5°. It is a singular fact that while in nearly all cases the beginning of the melting lies between 62° and 67°, the complete melting point is higher than that of the vanillin itself if the quantity of acetanilid exceeds 25 per cent., whilst with the lower percentages, 25 per cent., 20 per cent., etc., the melting point is lower than that of pure vanillin.—Pharm. Centralh., July 7, 1898, 485.

COLORING MATTERS.

Chlorophyll—Production in the Dark.—A. Etard and M. Bouilhac cultivated *nostoc punctiforme* in perfect darkness in a suitable solution of glucose, and obtained a bright green growth, the color of which is due to chlorophyll. The fresh coloring matter gives precisely the same absorption as fresh chlorophyll grown under normal conditions.—Pharm. Journ., Aug. 27, 1898, 241; from Compt. rend., cxxvii., 119.

Alkanine.—Presence in a number of plants belonging to the *boraginaceæ*, which see under "Materia Medica."

Digitoflavon—Characterization.—F. Fleisher has investigated the characters of the coloring matter, digitoflavon, which Kiliani had observed in the course of the preparation of digitoxin from the leaves of *digitalis purpurea*. It is not a glucoside, and its coloring properties do not manifest themselves in the plant itself. It is not related to the digitalis glucosides, but with bodies belonging to the quercetin series. It is a trivalent phenol, which by the action of alkalies is split into phloroglucin and a red resin. By concentrated hydrochloric acid at a high temperature it is

split into pyrocatechin and a derivative of phloroglucin. It readily forms double compounds with the mineral acids.—Apoth. Ztg., Feb. 4, 1899, 68.

Scoparin—Relation to Vitexin.—From the observations of Stenhouse and subsequently of Hlasiwetz it developed that the coloring matter of broom (*spartium scoparium*), named by Stenhouse scoparin, belongs to the quercetin group, while the similarity of the dyeing properties of scoparin and vitexin pointed to the close relationship of these two bodies. These observations have now been confirmed by A. G. Perkin, whose analytical figures agree with the formula, $C_{21}H_{22}O_{11}$, provisionally established by Stenhouse and subsequently by Hlasiwetz, while fusion with alkali at 220° resulted in the production of phloroglucinol and protocatechuic acid. When digested with hydriodic acid, a new coloring matter, *scoparein*, results with evolution of one mol. of methyl iodide. With boiling potassium hydrate solution, scoparin gives phloroglucinol, vanillic acid, and a third substance, which is crystalline, and has the composition $C_9H_{10}O_3$. Solutions of vitexin and scoparin in sulphuric acid, when heated, both develop a dull green coloration. Vitexin, however, by decomposition with alkali yields p-hydroxyacetonephenone and phloroglucinol, and it is thus probable that scoparin is a methoxy-vitexin.—Proc. Chem. Soc., *15*, 123.

Indigo—Conditions of Fermentation.—The transformation of indican into indigo blue in the *indigofera*, according to H. Molisch, is not due primarily to the action of bacteria, oxygen being indispensable to the process, whether it takes place within or without the dead cell; nor is the process accompanied by a single species, a number of different bacteria being present, together with mould-fungi. Indican is in some cases formed only in the light; in other cases both in the light and in the dark, but always more abundantly in the light. The following species are added to the list of indigo plants: *Echites religiosa*, *wrightia antidysenterica*, *crotolaria cunninghamii*, *C. turgida*, and *C. incana*.—Pharm. Jour., March 18, 1899; from Wien. Akad. Ber., July 7, 1898.

Albuminoids,

(*Including Animal Products.*)

Proteids—Formation in Green Plants.—The recent researches of B. Jacobi throw considerable light on proteid formations in green plants. The special center for the synthesis of proteids is the foliage leaf. The process may be begun in darkness in those cells participating directly in proteid formation, since carbohydrates react with nitric acid, ammonia or amides to this end; nevertheless, how far the process progresses depends on the amount of available carbohydrates. If the latter are present in abundance, the formation of proteids will take place; with small amounts of carbohydrates the process ceases in darkness with the formation of

amides. The natural supply of carbohydrates can only be augmented to an adequate amount by providing, through the access of light, the conditions necessary for assimilation of carbon dioxide. In this case the light co-operates indirectly in the synthesis of proteids. The special source of energy is supplied by the carbohydrates themselves, though, in many cases, light also appears to play a part as a source of energy.—Pharm. Journ., April 1, 1899, 295 ; from Biol. Centralbl., through Bot. Gaz., 27, 148.

Albumin—Question of Synthesis.—Referring to the announcement at the recent International Congress of Applied Chemistry, that Dr. Leo Lilienfeld had claimed to have effected the synthesis of albumin, Alfred H. Allen points out that the circumstances of the announcement are not such as to encourage implicit faith in the reality of the discovery. From the accounts which have hitherto come to hand it appears that it is not true albumin of which Dr. Lilienfeld claims to have effected the synthesis, but "peptone," which is a very different thing. It is said to be produced by the condensation of glyconine (amido-acetic acid) with phenol, by means of phosphorus oxychloride, and the reaction is stated to occur quantitatively and with great facility ; but the description of the mode of formation of the synthetic body appears to negative the conclusion that Lilienfeld has effected the synthesis of either albumin or peptone. It by no means follows, however, that he has not produced an albuminoid substance of great theoretical value, and he has undoubtedly been working in the right direction. A cardinal defect in the process as communicated is that it does not in any stage involve the use of sulphur in any form, when, as is well known, sulphur is an essential constituent of both natural albumin and peptone. Mr. Allen considers it not improbable that the method of Dr. Lilienfeld may have been suggested to him by the interesting and ingenious suggestions made by Dr. P. W. Latham in the course of his Croonian Lecture in 1886. These are discussed and elucidated at some length in the present paper. — Pharm. Journ., Aug. 27, 1898, 242–243.

Albumen—Determination of Value by Iodine Absorption.—In a former paper, Dr. Karl Dieterich had called attention to the importance of estimating the value of commercial (dry) albumen by the amount of iodine it is capable of absorbing, and that the iodine-number shall not fall below 100 in any case. He has since made numerous experiments, both upon dry egg albumen of his own preparation and the commercial article, and finds the iodine absorption number for the former to be between 130 and 170, calculated for the substance containing 7–9 per cent. of water, while for the anhydrous albumen the iodine number is 140–190. Commercial albumen of good quality may contain from 13.5 to 17.5 per cent. of water, and shows an iodine number of 110–150, while the anhydrous article gives numbers from 150–175. Accepting these figures as normal, commercial dry albumen should in addition respond to the following require-

ments: It should not contain more than 17.5 per cent. of water; should not yield more than 6 per cent. of ash; should not yield more than 1 per cent. of its weight (fat) to ether, and the solution should not be yellow in color; should not leave more than 5 per cent. of residue when treated with water, and should be as free as possible from fibrin.—Pharm. Centralh., Nov. 5 and 10, 1898, 789–792 and 811–816.

Albumen—Addition of Ammonium Salts to Facilitate Coagulation.—From experiments made by G. Halphen he concludes that some ammonium salts, such as the citrate and hydrochloride, favor the separation of albumen; that the soda set free at the moment of coagulation displaces the alkali of the ammonium salt, thus creating a more favorable medium for coagulation; that the coagulation of albumen is complete in the presence of citrate or of ammoniacal salts; and that operations carried out for the purpose of estimating the albumen are much more exact and are less troublesome when ammonia salts are used.—Chem. News, Jan. 20, 1899, 35; from Journ. de Pharm. (1899), viii., No. 4.

Egg Albumin—Conversion into Sugar.—By treating pure egg albumin, which had been carefully freed from all traces of sugar, with barium hydrate and hydrochloric acid, Ferdinand Blumenthal succeeded in preparing a sugar which forms an osazone with phenyl-hydrazine, melting at 194°–204° C. This proves to be a glucose, and from its action on polarized light and resistance to the fermentative action of yeast is almost certainly levulose. The yield is from 8 to 12 per cent. of the albumin.—Pharm. Journ., Feb. 4, 1899, 95; from Compt. rend., cxxviii., 117.

Similar results have since been obtained by several other observers, and Paul Meyer in following up the inquiry obtained a sugar from the albumin of egg-yolk. Analysis showed both this sugar and that obtained from egg-white albumin to be a hexose. Judging from the character of the osazone it was not mannose or fructose, and the question whether it was galactose or glucose was not positively settled. Moreover, it appeared that other carbohydrates could be eliminated from albumin, forming osazone compounds similar to that of the pentose obtained from nuclein.—Pharm. Journ., March 11, 1899, 227; from Berichte, *32*, 274.

Albumins—Compounds with Ichthyol.—The trade-named preparation known as "ichthalbin," may be made from albumin, peptone, casein, as well as other albuminoid substances. According to Chem. Ztg., (1898, (873, ammonium sulphoichthyolate is mixed with a solution of the albuminoid substance, and diluted sulphuric acid is added. A precipitate is produced, which is removed by expression, dried and powdered. To remove the unpleasant odor and taste it is heated for 24 hours to about 120° C.; or, it is treated with alcohol, benzol, ligroin, chloroform, etc., which remove the essential oil to which the odorous, etc. qualities are due. The product obtained—under the patent—is odorless and tasteless, and is not digestible in the stomach, but gradually absorbed during its passage through the intestines.—Apoth. Ztg., Oct. 22, 1898, 741.

Ichthyol Albuminate—Preparation.—G. Hummer recommends the following formula for preparing ichthyol (or petrosulfol) albuminate, as being more suitable for internal use than these substances in their crude condition: a solution of 5 parts ichthyol (or petrosulfol) in 50 parts water is mixed with 195 p. of a clear solution of albumen (25 parts dry albumen, 170 parts water), and alcohol is then added to completely precipitate the ichthyol albuminate formed. The precipitate is collected, washed with water, pressed, dried at 100° C., and powdered. The yield is about 6 times the quantity of ichthyol employed, the product being of a cacao brown color, odorless, tasteless, and soluble only when it passes into the intestines.—Pharm. Centralh., June 22, 1899, 380; from Pharm. Rundsch., 1899, 329.

Ovalbuminic Acid - Formation and Character.—J. M. Albahary, by the action of iodine on powdered egg albumin in the presence of amorphous phosphorus and water, has obtained a decomposition product free from iodine which acts as an acid and yields a sodium salt crystallizing in fine needles. The liberated acid is practically insoluble in water and in solutions of neutral alkali carbonates, but dissolves in mineral acids. It is precipitated from its solution in hydrochloric acid by picric acid, phosphomolybdic acid, and by gold and platinum salts. At 260° to 270° C. it melts with decomposition. — Pharm. Journ., Aug. 27, 1898, 241; from Compt. rend. cxxvii., 121.

Chloralbacid — A New Type of Albumen Compound. — Professor W. Fleiner calls attention to a new albumen substitution compound, chloralbacid, which is the type of a series of similar halogen substitution compounds. When chlorine is caused to act upon albumen, the latter is partly converted into chloralbumen, and a certain amount of HCl formed. On the removal of HCl, a further quantity of chlorine combines with the albumen, and more HCl is formed, and by this alternate removal and renewed chlorination, a chlorinated substitution compound of albumen is produced, which constitutes the basis of chloralbacid. It, however, does not appear to be a definite compound, to judge from the author's description. In the form of a sodium compound it is recommended in the treatment of atonic stomach troubles.—Münch. Med. Wochenschr., 1899, 1.

Opalisin—A New Albuminoid in Milk.—A new albuminoid which is characterized by opalescence has been isolated from milk by Wroblewski, who has named it opalisin and attributes to it the formula $C_{150}H_{292}N_{43}PS_6O_{68}$. Human milk is richest in this body, mare's milk next, and cow's milk contains less than either of the others.—Pharm. Journ., April 15, 1899; from Annales de Pharm., *5*, 74.

Human Milk—Distinction from Cow's Milk by means of Ammonia.—N. Umikopp states that when woman's milk is mixed with ammonia it soon assumes a rose-violet color, even at the ordinary temperature. If 5 Cc. of the milk are mixed with 2.5 Cc. of 10 per cent. ammonia water and the

mixture is heated on a water bath to 60° C. for 15 to 20 minutes, the reaction takes place under the most favorable conditions, while when heated to boiling the reaction is vitiated. Neither cow's milk nor the milk of sheep or camels produces a color reaction under the conditions named. The reaction is prevented if ammonium chloride is added to the milk; also by more than 3 vol. alcohol or 1 vol. of ether or chloroform. The reaction is stronger in proportion to the age of the milk, the older giving also the stronger reaction.—Pharm. Centralh., May 11, 1899, 304.

Human Milk—Variation of Composition at Different Periods.—From the study of the data derived from seventy-two analyses of woman's milk, taken morning, noon, and night, and then mixed and examined, Ch. Michael found it possible to draw wide distinctions between the milk of women recently delivered and those who had passed that stage, a period varying between two and twelve months. The milk of women recently delivered was notably richer in nitrogen compounds, extractive matters and mineral salts, and poorer in fat and in lactose.—Pharm. Journ., Nov. 12, 1898, 505; Rép. de Pharm., x., 452.

Condensed Milk—Composition of Commercial Kinds.—F. L. Hyde has analyzed twenty-one samples of condensed milk. With three exceptions, in each case the so-called "Evaporated Milks," all the samples contained cane sugar, which is apparently added as a preservative. The total solids in the "evaporated milk," were from 30.46 to 35.24 per cent.; in those containing cane sugar 71.16 to 79.12 per cent., the amount of the latter varying from 28.94 to 42.96 per cent. The milk sugar ranged from 9.5 to 17.20 per cent., the average being 11.12. The fat was found to range from 6.73 to 11.82 per cent., only five samples containing over 10 per cent.—Pharm Review, June, 1899, 263; from Journ. Amer. Chem. Soc., *21*, 439.

Milk—Convenient Method of Detecting Boric Acid.—L. de Koningh recommends the following method for detecting boric acid in milk: Place 100 Cc. of milk into a beaker, cover with a dish, and heat rapidly to the boiling point. Then add 8 Cc. of 1:50 nitric acid, allow to cool, strain through muslin and collect 80 Cc. of liquid, which need not be absolutely clear. Add to this liquid one-eighth of a gramme of sodium carbonate, evaporate rapidly in a platinum dish, and finally burn to a gray ash—the sodium nitrate formed assisting in the burning without causing deflagration. The ash is treated with water, and the solution tested for boric acid by one of the well-known methods. By this process the loss of acid consequent on the incineration of a larger quantity of fatty organic matter is avoided.—Amalyst, *24*, 145.

Caseinogen—Physico-Chemical State in Milk.—On the basis of his investigations upon the conditions under which fat and caseinogen exist in milk, Dr. David Frazer Harris concludes that caseinogen is not in solution in milk plasma, but is present, along with fats, in both the globules and the

particles in a state of minute sub-division—that is, both the fat and the proteid are "particulate," or minutely granular. The globules contain a maximum of fat and a minimum of caseinogen. The particles contain a minimum of fat and a maximum of caseinogen. Thus the globules are not pure fat or oil, and the particles are not pure caseinogen. In fact, caseinogen apart from fat, even though it be but the minimal trace, is unknown in nature, and is a concept in the mind of the physiological chemist. Nor is such a body improbable from its complexity, for in haemoglobin and in lecithin we have bodies which are, if anything, more complex; and just as by chemical and physical agencies these can be broken up into their constituents, so by the same agencies can the oleo-nucleo-proteid of milk be broken up into its constituents. If, therefore, the term "caseinogen" is to be retained, its connotation must be extended so as to embrace the fat molecule.—Pharm. Journ., Sept. 24, 1898, 352; from Brit. Med. Journ.

Wheat Gluten—Further Studies Respecting its Complex Character.—It was first shown by Taddey that wheat gluten is separable by treatment with alcohol into a vegetable gelatin-gliadin, and an insoluble portion which he named zymon. Other investigators have added several more substances to this list, but some of these were doubtless the same substance, to which different names had been given by the respective investigators. In one of the more recent investigations, Ritthausen pointed out the existence of four proteids in wheat gluten—viz.: gliadin, gluten fibrin, mucedin, and gluten casein. The latter has since been called glutenin by Osborne, who contends that wheat gluten is composed of two proteid substances, the one soluble in alcohol called gliadin, the other insoluble called glutenin (Osborne), vegetable fibrin (Liebig), coagulated albumin (Berzelius), zymon (Taddey), and gluten casein (Ritthausen). Osborne's views were, moreover, confirmed by Fleusch and also Kjeldahl, who found that the proteid soluble in alcohol had a constant rotary power, and therefore inferred that it must be homogenous. Further investigation has, however, led Ritthausen to conclude that gluten contains constituents having a higher amount of carbon and less nitrogen than gliadin, though he did not succeed in separating them. As regards the opinion of Morishima, that gluten consists of a single proteid, to which he gives the name "artolin," Ritthausen suggests that this substance may be only gluten casein (glutenin or vegetable fibrin) combined with hydrochloric acid, as the result of the mode of preparation adopted by Morishima.—Pharm. Jour., June 17, 1899, 546; from J. Prakt. Chem., 59, 1474.

Gluten Preparations — Examination of Commercial "Starch-free" Products.—A. J. Cownley reports on the examination of a number of gluten preparations of the market, which are generally believed, or are claimed, to be free from starch. He finds that many of these so-called starch-free glutens contain an inordinate amount of amylaceous material.

A so-called "gluten" was found to contain 62.1 per cent. of starch. Five different samples of "gluten flour" contained respectively 61.2, 2.8, 5.4, 63.5 and 63.4 per cent.; "gluten bread" contained 37.4 and 63.0 per cent.; "bran biscuits," contained 14.3, 19.8, 14.4 and 6.7 per cent.; "gluten macaronis," 65.2 per cent., and "gluten Vermicelli," 62.1 per cent. of starch. The samples examined comprise most of the gluten preparations supplied for use in the dietary of diabetic patients; but many of them are shown to be very little different in their composition from ordinary wheaten flour.—Pharm. Journ., Sept. 17, 1898, 327.

Gluten Flour—Examination of Commercial Samples.—Victor G. L. Fielden has examined five samples of gluten flour supplied by as many large houses in Great Britain, with the results shown in the following table:

Sample.	A	B	C	D	E
Gluten.....	76. p. c.	60. p. c.	65. p. c.	8.5 p. c.	66. p. c.
Starch and sugar.....	7.6 p. c.	16.7 p. c.	13.26 p. c.	68.8 p. c.	11.63 p. c.

These results show that with a single exception (D) the gluten flour contained a large percentage of gluten and consequently suitable for the use of diabetic patients. The exception (D) is stated to be a product of American manufacture, sold as "crude gluten," and in composition appears to differ very little from wheaten flour. The method of examination consisted in washing 10 Gms. of the sample thoroughly in a bag of close muslin in a stream of water until a small quantity of the washing when boiled gave no blue color with tincture of iodine. The plastic residue was then dried in a tared dish to constant weight. The starch and sugar were assayed together, no account being taken of their relative proportion. Two Gms. of the flour were boiled with 20 Cc. of sulphuric acid and 200 Cc. of water for three or four hours; the liquid was then neutralized with caustic soda, brought to a definite bulk with water, and the amount of glucose determined in an aliquot part of this with Fehling's Solution in the well-known way.—Proc. Brit. Pharm. Conf., 1898, 347–353.

Fibrin—Crystalline Variety—A. Maillard, examining a deposit which had formed in the course of a few months in some tubes of anti-diphtheric serum, found it to consist of fibrin in the form of angular granules which polarized light shows to be of crystalline structure with some lamellæ of a clinorhombic aspect. He, moreover, finds that this form of fibrin is not peculiar to antidiphtheric serum, having obtained it also from ox-blood serum when sterilized and set aside. It is, however, only found in those tubes which show a deposit after standing some months; if a precipitate appears in a few weeks it consists of amorphous fibrin in the ordinary form. It would appear, however, that fibrin, like the globulins of the reserve material of plants, should not be regarded as uncrystallizable, but

rather as slowly crystallizable.—Pharm. Journ. April 22, 1899, 359; from Compt. rend., cxxviii., 373.

Ferments — Occurrence in Aconite and Belladonna. — E. Lepinosis finds that the expressed juices of aconite (leaves (?) Rep.), and belladonna contain oxydases which are destroyed by a brief exposure to a temperature of 100° C. The belladonna ferment, precipitated by alcohol, was found to give 31.36 per cent. of ash; that from aconite 33.57 per cent. It is noteworthy that the latter contains but a feeble trace of manganese, which has been regarded as an essential constituent of these oxydases. These researches have a practical pharmaceutical bearing, since the author finds that it is to the presence of the ferments that the changes of color observed in the alcoholatures of the Codex are due. These are prepared by macerating the crushed fresh herb in alcohol at normal temperatures. They speedily lose color, but if in the course of preparation they are heated to the boiling point for 15 to 30 minutes, they will keep perfectly, maintaining their bright green color for several months.—Pharm. Journ., Feb. 4, 1899, 96; from Journ. de Pharm. (6) *9*, 49.

Ferment of Digitalis—Occurrence of a Similar Body in the Other Plants.—Brissemont and Joanne have studied the characters and nature of the ferment first discovered by Kossmann in digitalis leaves, and considered by him peculiar to the plant. They find that it is an oxydase, and that it is probably analogous to the oxydases isolated from many plants, a similar body having been detected by them in the leaves, stems and green berries of *solanum dulcamara*. The authors find, furthermore, that while the fresh and recently-dried digitalis leaves are very rich in this ferment, it gradually disappears on keeping; leaves four months old gave marked reaction for its presence, when one year old but a feeble reaction, and when several years old no reaction whatever.—Pharm. Jour., Jan. 14, 1899, 25; from Jour. de Pharm. et de Chim., (6), *8*, 481.

Nepenthes Enzyme—Characters.—See *Pitcher Plants*, under "Materia Medica."

Yeast Enzyme—Extractive, Characters, etc.—Following up his previous researches on the alcohol-producing enzyme of yeast, J. R. Green has obtained results which confirm Buchner's announcement that the alcoholic fermentation of sugar is effected by the activity of an enzyme or soluble ferment which, by appropriate means, can be extracted from the yeast cell. The completeness with which it can be extracted depends upon successful disintegration of the cell, but for this purpose the enormous pressure—500 atmospheres per square inch—used by Buchner, is unnecessary, inasmuch as an extract obtained by a pressure of five atmospheres per square inch was more active. When so extracted, it sets up fermentation in sugar solutions under conditions which prevent the activity of living yeast. The enzyme is easily decomposed; like enzymes in general, it is largely thrown out of solution by the formation of an inert precipi-

tate in the liquid in which it is contained. The reaction of the enzyme by the cell is intermittent, only taking place during actual fermentation of the yeast. It is even decomposed when its activity ceases, so that resting yeast does not give it up to a solvent.—Pharm. Journ., Dec. 24, 1898, 665; from Annals of Botany, xlviii., 491.

Soluble Yeast—An Efficient Alcoholic Ferment.—Ed. Buchner and Rud. Rapp describe the preparation of soluble yeast, in the form of a dry powder, as follows: 500 Cc. of the freshly expressed liquor obtained from ordinary yeast is concentrated in a glass retort with the aid of a suction air-pump at a temperature of 20° to 25° C., a few drops of olive oil having been added to the contents of the retort. The liquor is not placed into the retort at once, but allowed to flow in gradually, the concentration to a syrupy consistence requiring about half an hour. The syrupy liquid is then spread upon glass plates which have been cleaned with ether, and dried in a vacuum or in an ordinary drying closet, according to convenience, at a temperature of from 22° to 35° C. After about twenty-four hours the product is scraped off the plates, and completely dried over sulphuric acid in a vacuum-exsiccator. About 70 Gm. of a yellowish powder is then obtained, having a pleasant odor of the yeast from which it is obtained. It is almost completely soluble in water, and when dissolved in the proportions in which it originally existed in the yeast-liquor, possesses the fermentative power upon sugar unimpaired. It appears also to be immaterial whether the final drying of the syrupy liquor is done *in vacuo* or by exposure to air, and the authors conclude that oxygen has no untoward action upon the zymase. Concerning its stability on keeping no conclusive data have yet been obtained—Apoth. Ztg., July 2, 1898, 459.

Diastase—Preparation.—A. Wroblewski proposes the following process for preparing pure diastase, which is based on the observation that diastase is soluble in alcohol below 50 per cent. in strength, but insoluble in alcohol of over 65 per cent. Three kilos of crushed malt are macerated in 6 liters of 68 per cent. alcohol for a day and expressed strongly. The residue of expression is then macerated twice successively in 6 liters of 45 per cent. alcohol for twenty-four hours, and the two weaker alcoholic expressed liquids so obtained are then mixed with sufficient strong alcohol to bring the alcoholic strength of the mixture to 70 per cent. This precitates the diastase, which is allowed to settle during a day, is then washed with 70 per cent. alcohol, then dissolved by trituration with 6 liters of 45 per cent. alcohol, and reprecipitated by strong alcohol, as before. The diastase is collected, dissolved in the smallest possible quantity of water and precipitated from this solution by adding magnesium sulphate to saturation. The precipitate is washed with a small quantity of saturated magnesium sulphate solution, then redissolved in the smallest possible quantity of water, and the solution so obtained subjected to dialysis. The

yield of pure diastase is 2.82 Gm. from the 3 kilos of malt taken.—Pharm. Journ., Nov. 5, 1898, 481; from Journ. de Phar. et Chim. (*6*), viii., 316.

Taka-Diastase—Inferiority to Diastase as a Starch-Reagent.—The experiments of W. E. Stone and H. E. Wright, undertaken with a view to ascertaining its value as an analytical reagent for the determination of starch, appear to show that, in spite of its greater stability, it is not suitable for the quantitative estimation of the starch of wheat, rice, and maize as is the malt diastase usually employed for this purpose. It is true that the commencement of the action of taka-diastase on starch is more immediate than that of malt-diastase, but after the lapse of a few hours a considerable quantity of the starch remains in presence of the former, while there only traces remaining in presence of malt-diastase. After seven hours the digestion is quite complete in the case of malt-diastase, but not when taka-diastase is used.—Journ. Amer. Chem. Soc., 1898., xx., 639.

Diastatic Digestion—Investigations Concerning the Process on Starchy Foods in the Stomach.—Prof. A. E. Austin, not being able to find any definite statements based on actual experiments, concerning the general supposition that the diastatic digestion of starchy food in the stomach is interfered with by the hydrochloric acid of the gastric juice within a short time after each meal, has made a systematic research with the view to throwing some light on their important physiological function. The importance of this becomes apparent when it is considered that more than two-thirds of the human daily food consists of starchy food, and it is therefore very interesting as well as important to learn how and where this starchy food is digested. The results of these researches are summarized by Professor Austin as follows:

(1) Taka-diastase digests starch with remarkable rapidity in a neutral, or slightly acid medium; and its rapidity is directly proportional to the quantity of taka-diastase used. Taka-diastase in the above medium is capable of digesting three hundred times its own weight of starch in an hour.

(2) The digestion of starch by taka-diastase is accelerated and enhanced by the presence of a small quantity of free hydrochloric acid, while beyond a certain amount the free hydrochloric acid retards and eventually arrests the diastatic digestion.

(3) The digestion of starch by taka-diastase is not interfered with by organic acids for all practical purposes; on the contrary, the presence of a small quantity of organic acid enhances the diastatic digestion of starch.

(4) The presence of albumin combined with hydrochloric acid seems to lessen the hindering action of free hydrochloric acid on starch digestion.

(5) Albuminous foods—both of animal and vegetable origin—combine with, or neutralize, free hydrochloric acid of gastric juice, making the acid

perfectly inert. The combined hydrochloric acid has no hindering action on diastatic digestion.

(6) In dogs' stomachs, when albuminous foods are given with starchy foods, no free hydrochloric acid is found at the end of one hour, and in the meantime starchy foods are perfectly digested.

(7) In the human stomach, when an ordinary regular meal is taken, the albuminous matter of the food combines with the hydrochloric acid of the gastric juice as fast as it is formed, at least for a period of one hour, and such combined hydrochloric acid has no hindering action on starch digestion; and the diastatic digestion of starchy food is practically completed within that period.—Reprint from Bost. Med. and Surg. Journ., April 6, 1899.

Diastatic Digestion of Starch in the Stomach—Non-Retarding Action of Combined Hydrochloric Acid.—By his previous investigation (see above) Prof. Austin had shown that practically the larger part of the starchy food we eat is digested in the stomach by the action of the ptyalin of saliva before the free hydrochloric acid of the gastric juice prevents its appearance and accumulates to the point where it hinders the salivary digestion of starchy food. He has since continued his researches with the object of supplementing and confirming the results of his previous experiments on the human stomach. He observes preliminarily that with the usual diet the amount of albuminous food constitutes approximately one-fourth, and the starchy or carbohydrate food constitutes two-thirds; the remainder, one-twelfth, consists of fats and other elements, whether the person is a meat eater or vegetarian. The former derives his albuminous material chiefly from animal food, such as meat, fish, etc., while the latter derives the nitrogenous matter principally from leguminous food, such as peas and beans. The results of these supplementary researches lead him to the following conclusions:

(1) That when a non-albuminous test-meal is given, free hydrochloric acid makes its appearance at the end of twenty minutes after eating, and at the end of half an hour the amount of free hydrochloric acid equals that of one or two hours after eating where albuminous foods are taken.

(2) Under normal conditions, the ptyalin of saliva digests most of the starchy constituents of food in the stomach within one or two hours, which takes place before free hydrochloric acid accumulates in the stomach to such an extent as to interfere temporarily with the diastatic action of saliva on starchy food. Those portions of starchy food which remain comparatively undissolved, and pass over to that portion of the digestive canal where they are acted upon by the pancreatic diastase, constitute a very small portion of the starchy food taken.

(3) That the administration of isolated diastase considerably enhances the digestion of starchy food in the stomach even under normal conditions.

(4) The elimination of the supply of the ptyalin of saliva to the stomach will cause marked retardation of starchy digestion in the stomach.

(5) A maldigestion of starchy food, due to the deficiency of the diastatic power of saliva, can be regulated by the administration of isolated diastase.

(6) The impression held by many that the diastase of saliva becomes non-active fifteen or twenty minutes after eating, is totally erroneous.—Reprint from Boston Medical and Surgical Journal, June 29, 1899.

Pepsin and Pancreatin—Non-Interference of Boric Acid with Proteolytic Action.—The practical value of boric acid as a preservative of meat depending largely upon the extent to which its presence interferes with the proteolytic action of pepsin and pancreatin, Dr. F. Keppler has made experiments with albumen in a pure state and albumen to which various quantities of boric acid had been added, in order to determine the extent of such interference. The experiments were conducted under identical conditons in all respects except as to the presence and amount of boric acid, and the results point out that the presence of either borax or boric acid in no way interferes with the action of the proteolytic ferments named. —Pharm. Centralh., 1899, 17.

Pancreatin—Superior Activity of that from Pig's Pancreas.—In the course of some experiments Eug. Choay had occasion to prepare an aqueous extract of the pancreas of a pig. It occurred to him to make comparative experiments with it and commercial pancreatin, and he found the proteolytic power of the extract far superior to that of the commercial article of a brand very well known in pharmacy. The same was observed with regard to the power of liquefying starch paste. Other experiments were made on its action on fibrin, starch, and fat, and the conclusions drawn are: 1. that it is of great importance to assay all pancreatins; 2. that the aqueous extract of the pancreas concentrated in vacuo at a low temperature is an excellent preparation; 3, that pancreatin prepared carefully according to the Codex has the same activity as the aqueous extract on proteic and amylaceous materials. They only differ from that prepared *in vacuo* in that their power of saponification is greater.—Chem. News, July 22, 1898, 47; from Journ. de Pharm. (6), vii., No. 9.

Peptones—Removal of Albumoses.—According to P. Müller the albumoses may be completely and easily separated from peptones, as follows: The liquid containing the two in admixture is mixed with an equal volume of a 30 per cent. solution of ferric chloride, and potassium or sodium hydrate solution is added until the liquid reacts only faintly acid. It is then filtered, the filtrate is well shaken with a little zinc carbonate, and again filtered. The filtrate so obtained is absolutely free from albumoses. —Apoth. Ztg., Dec. 21, 1898, 889.

Peptones and Peptonates—Preparation.—Prof. Wilbur L. Scoville and

Chas. H. Howard give the details of a number of experiments made with the object of devising suitable methods for the preparation of peptone and peptonates. The preparation of peptone was carried out on the following lines, the deviations being in temperature, proportion of pepsin, etc.: Lean beef, chopped fine, 25 Gm.; water, 100 Cc.; pepsin (1 : 2500), 0.01 Gm., hydrochloric acid, q. s. ad. 0.2 per cent. strength. The mixture was digested six hours and shaken regularly at five-minute intervals, at temperatures varying from 40° to 50° C. At the end of six hours the greater part of the albumin was digested, and the fluid was separated from the unconverted meat by filtration. The fluid was neutralized with sodium carbonate, then evaporated on a steam bath to a syrupy consistence, spread on glass plates, and dried. The experiments made indicate, (1) that a temperature of 50° C., or slightly above that of the body, is best; (2) that an increase in the proportion of pepsin beyond that of one part to 2500 of meat does not materially increase the rapidity of digestion; (3) that the amount of fluid used is an important factor, too small a quantity of fluid checking digestion, and giving an inferior product; (4) that the commencement of digestion is the most vigorous time; and (5) that to obtain the quickest results, the stirring should be regular and continuous. From peptone prepared in this way—which may contain as much as 92 per cent. of absolute peptone—or from good commercial peptone, the

Pure Peptone may be prepared as follows: The peptone is dissolved in water, the solution is saturated with zinc sulphate, and allowed to stand for half an hour. The fluid is then filtered, the filtrate acidulated with hydrochloric acid, and an excess of bromine water added. This precipitates the peptone in a nearly pure condition; it is washed with bromine water and dried. Experiments were also made to determine a method for preparing

Peptonate of Iron.—Taking the formula of the German Pharmacopœia for albuminate of iron as a basis, the following has been found satisfactory: To a neutral solution of 10 Gm. of pure precipitated peptone in 500 Cc. of distilled water add 100 Gm. of solution of dialyzed iron (5 per cent. Fe_2O_3). Neutralize the mixture with a weak solution of soda, whereby the iron peptonate is precipitated, taking care to avoid an excess of alkali. Wash the precipitate with distilled water until the washings fail to give a precipitate with silver nitrate solution, then drain, transfer to a suitable dish and warm, adding just enough solution of soda (5 per cent.) to dissolve the precipitate. This solution when evaporated to a syrupy substance, spread upon glass plates and dried at 50° C., yielded thin brown scales which were found to contain 3.5 per cent. of iron, corresponding to 5 per cent. of Fe_2O_3.

Solution of Peptonate of Iron may be made directly from peptone

(using about 10 per cent. more if a good commercial article is used) as follows:

Peptone	4 grams.
Solution of dialyzed iron	20 Cc.
Aromatic elixir	30 Cc.
Alcohol	10 Cc.
Solution of soda	2 Cc.
Water q. s.	

Dissolve the peptone in 200 Cc. of distilled water, strain and add to the dialyzed iron solution previously diluted with 200 Cc. of water. Now add enough of a dilute solution of soda to exactly neutralize the mixture, as shown by the character of the precipitate, which, at the end of the reaction, collects in larger flocks and separates rapidly from the liquid. Wash the precipitate several times with water, by decantation, and drain. Transfer the magma to a suitable dish, add the solution of soda (2 Cc.) diluted with 8 Cc. of water, stirring immediately and continuously until dissolved; then add 20 Cc. of water, the elixir, the alcohol, and finally enough water to make 100 Cc. Care must be used to prevent waste and so weaken the solution. The product contains 1 per cent Fe_2O_3.—Drug. Circ., Dec., 1898, 287–288.

Parachymosin—A Rennet-Ferment Associated with Pepsin.—Ivan Bang states that the ordinary preparations of pepsin contain a rennet ferment which possesses properties distinct from those of the ordinary rennet ferment, chymosin, and which he therefore designates by the name of parachymosin. If a solution of a pepsin preparation containing parachymosin is digested with 0.2 to 0.4 per cent. of hydrochloric acid at a temperature of 39° to 40° C., the rennet-activity is completely destroyed upon neutralizing the liquid with an alkali. But if in place of alkali, calcium carbonate is used for neutralization, the mixture may be digested for days or weeks without impairing its power of coagulating milk. The author points out the distinction between chymosin and parachymosin, and mentions that parachymosin is contained in the stomach of the pig, and also in the juices of the human stomach; but whether the latter also contains chymosin he is not prepared to say. On the other hand, the rennet of calves contains only chymosin.—D. Med. Wochenschr., 1899, 46.

Thyroid Glands—Iodine Value, etc.—R. S. Swinton communicates the results of experiments made to determine the amount of iodine in well-selected thyroid glands, as well as the relative solvent powers of water and of the mixed solvent official in the British Pharmacopœia, 1898, for preparing the extract. As the mean of three determinations of different lots of glands, by a method described in detail, he finds fresh thyroid glands to contain 0.0295 per cent. of iodine, these results agreeing with those obtained heretofore by various experimentors, viz., 0.03 per cent. The amount of iodine in the extracts made according to the British Pharmaco-

pœia directions conforms very closely to these figures, equaling 0.0293 per cent., calculated on the fresh gland. It was found, also, that water alone extracted practically all the iodine, the percentage obtained amounting in the extract to 0.0285 per cent. This would seem to prove that an aqueous extract may prove quite as efficient therapeutically as one made by the British Pharmacopœia process. The author, however, raises the question whether the value of thyroid preparations is in any way directly dependent upon the amount of iodine contained in them in organic combination. He finds that the precipitated extract made according to the formula suggested by Edward White (see Proceedings, 1893, 420) which is largely used in the London hospitals, and has beyond a doubt been found of extreme value, contains practically no iodine — not more than one-fortieth of that originally present in the glands.—Pharm. Journ., Nov. 5, 1898, 482.

Thyroid Glands—Iodine Value.—Referring to the above quoted paper, in which the author disputed the statement of Mr. Stanford that the British Pharmacopœia process of making liquor thyroidei does not dissolve out all the thyroidin, the latter suggests that the proofs to the contrary brought out by Mr. Swinton are by no means conclusive. The large amount of iodine found in the British Pharmacopœia liquor made from some thyroid glands may be due to glands that are quite abnormal, which becomes more plausible when it is considered that these glands weighed only 15.43 grains each, whereas in Mr. Stanford's experience the weight of glands varied from 24.2 to 136 grains each, and that the average was 33 grains. The failure to find iodine in the residual glands from which the British Pharmacopœia liquor had been prepared, is also not conclusive evidence that there was none present, for the method of combustion to ash, and particularly with the aid of KNO_3 to promote oxidation, is ill adapted for determining small traces of iodine. It offers means of losing iodine at every step. Mr. Stanford reiterates that in following the British Pharmacopœia process of making the liquor, thyroidin can be extracted from the residue, and much iodine remains in it. Moreover, the British Pharmacopœia liquor is not an elegant preparation, either in appearance or taste, and it keeps badly. —Pharm. Journ., Nov. 26, 1898, 546.

Thyroid Glands—Preservation by Formaldehyde.—Lépinois states that a 1 per cent. solution of formaldehyde exercises a preservative action on thyroid glands, after they have been immersed two or three days, without apparently modifying the chemical composition of the gland sensibly as regards the iodized albuminoid content. The solubility of the latter in pure or saline water is very slightly diminished, and the author concludes that these active principles when subsequently extracted possess better keeping qualities.—Pharm. Journ., Dec. 24, 1898, 665 ; from Bull. Soc. Chim. de Paris, xix.-xx., 982.

Thyroids—Antidotal Effect of Arsenic.—Bédard and Mabille have found that large doses of thyroid have a decidedly untoward effect on the heart's action. Experiments made upon dogs have shown that this poisonous effect is neutralized completely when arsenic is administered at the same time, and they recommend, therefore, the simultaneous administration of Liquor Potassii Arsenitis with thyroids when the latter medicament is indicated.—Apoth. Ztg., July 16, 1898, 1808; from Wien. Med. Bl., 1898, 432.

Thyroglandin—An Improved Extract of the Thyroid Gland.—E. C. C. Stanford expresses the opinion that, while the dried thyroid gland as now official in the British Pharmacopœia is probably more efficient than the liquor thyroidei (also official), its use is just as dangerous as the use of the raw gland, in that it may introduce into the system bacteria or other matters of foreign origin, which may give rise to disagreeable symptoms. The thyroid gland contains two important principles, each containing iodine, viz., iodo-globulin and thyrodin. In the customary processes for the preparation of the latter, the

Iodo-globulin, which amounts to about 17 per cent. of the raw gland, and is quite active alone, is always destroyed. The author finds that it can be easily extracted from the gland by cold water, and that the solution can be evaporated at 212° F. without in any way impairing it. The

Thyroiodin, which is more active, although existing in smaller quantity, can thus be extracted from the residual gland by boiling with weak caustic soda solution and precipitating by an acid. If then the two products, dried and powdered, are mixed, a preparation is obtained which represents the activity of the raw gland without its disadvantages, the usual yield being about 25 per cent. of the raw gland as against 29 to 30 per cent. of dry matter obtained from the latter on simply drying it. The author proposes the name

Thyroglandin for the new preparation, and suggests the following process: The thyroid glands, freed from fat, are minced, macerated in four or five times their weight of cold water (using ice in summer, to keep down the temperature to 50° F.) for 24 hours, and this maceration is repeated. The filtered solutions are evaporated to dryness at not exceeding 212° F., and the dry extract is powdered. The residual glandular substance is then boiled for 1 hour with a 1 per cent. solution of caustic soda in the proportion of 1 per cent. of caustic soda to the original gland. This solution is allowed to cool, to deposit the fat, and filtered off. The filtrate is carefully neutralized with hydrochloric acid and evaporated to dryness at 212° F. The residue is then powdered and mixed with the iodo-globulin first obtained. The finished product contains in addition to the two essential components of the gland a little sodium chloride. The dose is rather less than that of the dried gland, which is 3 to 10 grains.

The author calculates that 4.3 grains is about equal to half (one lobe) a gland.—Proc. Brit. Pharm. Conf., 1898, 353–358.

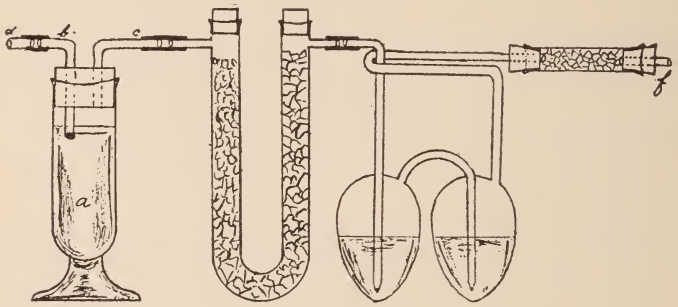
Iodothyrin — Indefinite Characters and Composition. — Blum has made experiments and furnishes analytical data which show that the so-called iodothyrin is not a substance pre-existent in the thyroid gland, but an indefinite product of splitting up. In accordance with his previously expressed opinion the iodine-substance of the thyroid is an unsaturated iodalbuminoid body, and the thyroid gland itself has the function mainly to arrest certain toxic substances from the circulation and to render them innocuous. The process of iodination which occurs in the gland accomplishes this object.—Pharm. Ztg., Nov. 5, 1898, 792.

Hæmatin — Variations. — According to P. Cazeneuve and P. Breteau, the composition of hæmatin in the blood of different animals is not the same. That from the horse contains 10.11 per cent. of nitrogen; ox-blood hæmatin contains 9.02 per cent.; sheep-hæmatin contains most, 10.65 per cent., of iron, horse-hæmatin 9.38 per cent., and ox-hæmatin 8.81 per cent.—Pharm. Journ., May 27, 1899, 483; from Journ. de Pharm. (6) *9*, 320.

URINARY COMPOUNDS.

Urine — Determination of Sugar by Fermentation. — Wm. C. Alpers describes the following process and apparatus (Fig. 70) for determining

FIG. 70.



sugar quantitatively in urine: A test-tube with foot, *a*, of from 50–60 Cc. capacity is provided with a rubber stopper having two perforations. Through one of the holes a bent glass tube, *b*, passes and extends to about an inch below the stopper into the fluid to be examined. Through the other perforation a similar glass tube, *c*, passes, the lower end being even with the stopper. A quantity of urine is weighed into the apparatus, a piece of yeast added and the stopper inserted. The outlet, *d*, is closed, and the tube *c* connected with a calcium-chloride tube and potash-bulbs, such as are used in combustion analysis. The potash-bulbs are weighed beforehand. Fermentation soon begins, and the carbon dioxide

generated rises in the tube and passes through *c* into the calcium-tube and potash-bulbs. After the reaction ceases (in from 8 to 10 hours), the tube *b* is carefully pulled up until its lower end is just above the level of the liquid. Suction is then applied to the outer end, *f*, of the potash-bulbs, and the cap at *d* removed, so that a current of air will pass through the whole apparatus. All carbon dioxide still lingering in the apparatus is thus drawn into the potash-bulbs, where it is dissolved, while all traces of moisture that may be carried along by the draft are absorbed in the calcium-tube. Finally, the bulbs are weighed again, and the increase in weight noted is the quantity of carbon dioxide yielded during the fermentation. From this the glucose can easily be calculated as follows:

$C_6H_{12}O_6$	=	$2C_2H_5OH$	+	$2CO_2$
Glucose		Alcohol		Carbon Dioxide
(179.58)		(91.80)		(87.78)

Hence, every 87.78 parts of carbon dioxide represent 179.58 parts of glucose; or, 1 part is the equivalent of 2.0458 parts of glucose.—Merck's Report, Aug. 1, 1898, 468.

Urine—Use of Litmus as a Test for Glucose.—According to A. M. Julhiard litmus, similarly to methylene blue and indigo, is reduced by glucose when heated in the presence of alkali. He applies this reaction for the detection of glucose in urine as follows: Having added some soda and a few drops of tincture of litmus to the urine, it is heated to boiling, when in the presence of glucose the urine acquires a dirty-yellow color, whereas urine free from sugar remains of a handsome blue color. The reaction becomes more distinct if the precipitate produced is allowed to subside. The original yellow color of the urine manifests itself very handsomely, but it is necessary to perform this expeditiously, since the reduced litmus again becomes blue by prolonged contact with the air.—Pharm. Centralh., Aug. 4, 1898, 571; from Rep. de Pharm., 1898, 201.

Urine—Detection of Albumoses.—Ludwig A'Idor, referring to the method of Salkowski at present popularly employed for the determination of albumoses in urine, observes that certain precautions must be observed to make it reliable. In this method, the albumoses are precipitated by phospho-tungstic acid, the precipitate being condensed by subsequent careful heating; but, as Salkowski has already shown, the urine may be completely free from albumoses, and, containing only urobilin, give the biuret reaction. The author therefore recommends the precipitation of the albumoses by phospho-tungstic acid, and the removal of the urobilin from the precipitate by means of absolute alcohol, the method of procedure being as follows: A few drops of hydrochloric acid and as much of a 5 per cent. phosphotungstic acid as may be necessary for complete precipitation are added to 8 or 10 Cc. of the urine; the precipitate is condensed by centrifuging, which requires about one minute, the liquid

decanted and the residue shaken with several Cc. of absolute alcohol, and the precipitate condensed by centrifugation as before. After decanting the highly colored alcoholic liquid, fresh absolute alcohol is added, and the process repeated in this way until the sediment appears perfectly white. The biuret reaction may then be applied with the certainty that it is not due to the presence of urobilin.—D. Med.-Wchschr. Ver.-Beil., 1899, 46; Apoth. Ztg., March 1, 1899, 109.

Urine—Detection of Bromine.—Ad. Jolles communicates a sensitive test for the detection of bromine in urine, which depends upon the fact that paper, saturated with a solution of the hydrochlorate of *p*-dimethylphenyldiamine (1 : 1000) becomes red in contact with bromine vapor. To carry out the test, 10 Cc. of the urine acidulated with sulphuric acid are placed into a narrow-necked flask, an excess of potassium permanganate is added (to redness), a strip of the reagent paper is fastened into the neck of the flask, and the heat of a water-bath is applied. In the presence of mere traces of bromine a characteristic red-violet color is developed on the paper—violet in the center, passing on the margins through blue to gray and brown.—Ztschr. Anal. Chem., 1898, *37*, 439; Apoth. Ztg., Mar. 15, 1899, 133.

Urine—Determination of Oxalic Acid.—The separation of oxalic acid from phosphoric acid in urine, which depends upon the solubility of calcium phosphate in acetic acid, is liable to inaccuracy because calcium oxalate is not absolutely insoluble in acetic acid, as is commonly assumed. Dr. E. Salkowski therefore recommends the separation of the oxalic acid by means of ether, in which phosphoric acid is almost completely insoluble. In the case of a very concentrated urine, having a sp. gr. 1040–1050, 200 to 250 Cc. are mixed with 20 Cc. of hydrochloric acid (1.12), and the mixture is shaken out thrice with 200–250 Cc. of ether containing from 5 to 10 per cent. of alcohol. The ethereal solutions are filtered, distilled, and concentrated after the addition of water to about 20 Cc. After cooling and subsidence of resinous substances, this concentrated liquid is filtered, rendered faintly alkaline with ammonia, 1 to 2 Cc. of 10 per cent. calcium chloride solution are added, and the mixture acidulated with acetic acid. The precipitated calcium oxalate is then treated and estimated by the customary methods. In the case of urines of moderate spec. gr.—1018–1020—500 Cc. are concentrated (to 250 Cc. ? Rep.) and treated in the manner explained.—Apoth. Ztg., May 3, 1899, 240; from Zentralbl. f. d. Med. Wochensch., 1899, No. 16, 257.

Urine—Detection of Biliary Coloring Matters.—Dr. A. Jolles determines the presence of biliary coloring matters in urine as follows: About 10 Cc. of the urine are shaken vigorously with 1 Cc. chloroform and 4 to 5 Cc. of a 10 per cent. solution of barium chloride, allowed to stand a few minutes, and the clear liquid removed from the precipitate by means of a

pipette. The residual precipitate is mixed with 2 to 3 Cc. of $\frac{N}{100}$ Hübl's iodine solution and 1 Cc. concentrated hydrochloric acid, shaken vigorously, and allowed to subside; the presence of biliary coloring matters is evidenced by the green to greenish blue color of the supernatant fluid—the reaction depending on the conversion of bilirubin into biliverdin by the iodine solution.—Apoth. Ztg., May 3, 1899, 240; from Ztschr. Oest. Apoth. Ver., 1899, 294.

Urine—Determination of Quinine by Picric Acid.—The presence of quinine in the urine after its administration is readily determined according to Christomanos by means of picric acid, its detection being quite possible even after doses of 0.25–0.1 Gm. It is an important observation that this reaction also takes place with Esbach's reagent (a solution of picric and citric acids), which, as is well-known, is frequently used on account of its convenience as a test for albumen. The presence of quinine in the urine might therefore occasionally lead to the supposition that albumen is present. The presence of the latter, however, is excluded by the failure of the boiling test, the potassium ferrocyanide test, etc. Moreover the two precipitates possess distinctive characters, that produced from quinine being pulverulent, whereas the albumen precipitate is flocculent.—Pharm. Zeit., Nov. 5, 1898, 792.

Urine—Removal of Odor after Eating Asparagus.—T. Carles recommends the salts of mercury and of copper for the removal of the odor of urine passed by persons after eating asparagus. The simplest plan is to add a crystal of cupric sulphate. The salts of lead and of bismuth do not answer.—Pharm. Journ., July 23, 1898, 73; from Rep. de Pharm., 1898, 263.

Urine—Toxity Due to Potassa.—Harrington has studied the toxic properties of urine, and finds that the manifestations of uraemia are not due to the formation of new bodies that are retained by the urine, but to the content of potassa in the latter. The intensity of the toxic symptoms varied in accordance with the amount of potassa present in the urine injected into animals experimented upon, whereas injection of urea or of uric acid produced no untoward symptoms.—Apoth. Ztg., May 6, 1899, 251; from La Presse Médicale, 1899, No. 34.

Uric Acid—Determination.—Triollet and Eury review the methods of Fokker, Hopkins, Cazé, and Folin for the determination of uric acid in urine, and give preference to the latter as being the simplest and most accurate. It is as follows: Add 10 Gm. ammonium sulphate to 100 Cc. of the urine, render the mixture slightly alkaline, shake, and set aside for two hours. Collect the precipitated ammonium urate on a filter and wash with a 10 per cent. solution of ammonium sulphate; then dissolve the precipitate on the filter with boiling water made slightly alkaline, allow the solution to cool, and make up the volume to 100 Cc. by the addition of water. On now adding 15 Cc. concentrated H_2SO_4, the temperature

should rise to 55° to 60° C.—this temperature being necessary to the final operation, viz., titration with standardized $KMnO_4$ solution. Add to the result 1 mgm., to allow for loss due to solubility of ammonium urate.—Pharm. Journ., July 23, 1898, 73; from Rép. de Pharm., 1898, 256.

APPENDIX.

Proceedings of State Pharmaceutical Associations (During the Year 1898).

Alabama.—The seventeenth annual meeting of the Alabama Pharmaceutical Association was held at Tuscaloosa, May 17 and 18, 1898. W. H. Bingham, of Tuscaloosa, was re-elected president, and Philip C. Candidus, of Mobile, secretary. The Committee on Adulterations made a report giving the results of the examination of the following drugs and preparations each in several commercial samples: *Powdered opium*, of nine samples three fell below the official requirement; *opium*, out of three samples two assayed satisfactorily; *extract of opium*, out of three only one assayed up to the official requirement. Three samples of *syrup of ferrous iodide* assayed 8.7, 9.4 and 9.8 per cent. of ferrous iodide. Of eight samples of *tincture of iodine* none came up to the official standard (7 Gm. in 100 Cc.), the quantities varying from 4.00 to 6.88 Gm. in 100 Cc. Six samples of *potassium bitartrate* assayed from 97.3 to 100 per cent. Four samples of *tartaric acid* assayed from 97.54 to 99.3 per cent. pure. Three samples of *citric acid* assayed 98.07, 99.09 and 99.1 per cent. respectively. Of three samples of *syrup of hydriodic acid*, two came up to the official standard. *Acetic acid* was satisfactory in one sample out of three examined, and the same was the result in the case of *stronger water of ammonia*. Three samples of *potassium cyanide* assayed respectively 66.5, 80.1 and 89.7 per cent. pure; one sample of *potassa* contained 90 per cent. KOH; three samples of *sodium bicarbonate* were found absolutely up to the pharmacopœial standard, and out of three samples of lard oil, one consisted largely of petroleum oil. Besides this report, only one paper was read, "The Relationship Between the Physician and Pharmacist," by Dr. Louis Edelman.

Colorado.—The ninth annual meeting of the Colorado State Pharmacal Association was held at Manitou, June 14th, 15th and 16th, 1898. E. R. Rankin, of Colorado Springs, was elected president; Chas. E. Ward, of Denver, permanent secretary. The reports were of a routine character, and the discussions were confined mainly to legislative and trade interests. No papers were presented at this meeting.

Connecticut.—The twenty-second annual meeting of the Connecticut Pharmaceutical Association was held at New Haven, June 21 and 22, 1898, John K. Lowe, of New Haven, was elected president, Arthur S. Clark, of

Waterbury, secretary. A highly interesting report on the progress of pharmacy was read by the Chairman of the Committee on Pharmacy and Queries, the various subjects brought forward being considered under the following captions: "Why Pharmacists Should join their State Association." "Association Papers." "Commercial Pharmacy." "How to Increase the Druggist's Profits." "Pointed Questions for Druggists." "How to Restore Prices." "The Druggist as a Robber." "Practical Pharmacy." "Percentage Solutions." "Unnecessary Difficulties." "Percolation or Dilution?" "Hints to the Pharmacists." "Sell What is Wanted." "Don't Get Caught." "At Least Look Busy." "Prices for Prescriptions." "Poison in Beer Bottles." "How to Establish Congenial Relations with Physicians." "Substitution as a Barrier." "Cut Prices on Patent Medicines." "Abuse of Prescriptions." "Queries." Only one paper was presented at the meeting, viz.: "The Apothecary in Great Britain *versus* the Apothecary in the United States," by Charles F. Williams.

Illinois.—The nineteenth annual meeting of the Illinois Pharmaceutical Association was held at Clifton Terrace, June 6, 7, 8, 1898. Theo. C. Loehr, of Carlinville, was elected president; Frank Fleury, of Springfield, was re-elected secretary. The report of the Committee on United States Pharmacopœia presents some valuable suggestions. It is recommended that all classes of preparations be officially defined, and that wherever practicable, a general process be introduced; or several processes, as in the case of the various preparations made by solution and extraction, for example the following:

Aquæ (The aromatic waters): *Liquores*, *Spiritus*, *Syrupi*. (1) Made from fluid extract, (2) by extraction. *Emulsa*, *Vina*. (1) By solution, (2) by extraction. *Tincturæ*, *Extracta*, *Extracta fluida*, *Oleoresina*.

In addition to the solid preparations for internal use, there should be added definitions and general formulas for:

Capsulæ Gelatinæ. *Capsulæ Amylaceæ* (cachets, wafers). *Pastillæ* (Trochiscæ). *Tablettæ* (triturates). The definition of

Tablet, for example, might be as follows: A mixture of medicinal substances made into a mass with a mucilaginous or saccharine vehicle, capable of slow disintegration and solution by the heat and moisture of the saliva, forming a viscid vehicle for the most favorable prolonged local effect upon the mucous surfaces of the respiratory or digestive organs. Definitions and general formulæ for other preparations—gargles, injections, lotions, oils, crayons, caustics, soaps, cotton, gauze, plaster mulls, etc.,—may be given similarly.

The following papers were read:

"The Microscopic Study of Vegetable Drugs," by Prof. W. B. Day.

"The Modern Presentation of Chemistry," by Prof. David L. Davoll.

"What Legislation, if any, should the Druggist Seek?" two papers, by Loren Mathison and by Wilhelm Bodemann.

"Is it Advisable for the Druggist to Cease Handling Patent Medicines which are Advertised to the Public?" by Wilhelm Bodemann.

Indiana.—The seventeenth annual meeting of the Indiana Pharmaceutical Association was held at Indianapolis, June 8 and 9, 1898. F. H. Burton, of Evansville, was elected president; A. Timberlake, of Indianapolis, secretary.

The following papers were read:

"A Note on the Presence of Living Organisms in Ointments," by Prof. F. R. Eldred.

"A Plan to Dispose of Dead Stock by Mutual Exchange," by C. H. Warne.

"Mercenary or Professional Pharmacy," by F. H. Burton.

Iowa.—The nineteenth annual meeting of the Iowa Pharmaceutical Association was held at Clear Lake, July 6, 7, 8, 1898. W. G. Bale, of Webster City, was elected president; A. H. Miles, of Des Moines, secretary.

The following papers were read:

"Belladonna Plasters," by John W. Ballard.

"Introducing Pharmaceuticals with Physicians," by C. S. Collins.

"The Value of Education in a Pharmaceutical Life," by Mrs. W. G. Bale.

"A Summer Outing" (a report from the delegation to the American Pharmaceutical Association), by Mrs. Fletcher Howard.

Kansas.—The nineteenth annual meeting of the Kansas Pharmaceutical Association was held at Atchison, May 24–25–26, 1898. L. Ardery, of Hutchinson, was elected president; F. A. Snow, of Topeka, secretary.

The report of the Committee on Adulterations calls attention to a number of drugs which have been found adulterated or unsatisfactory in quality: *Powdered borax*, containing a large proportion of sodium carbonate. *Powdered valerian root*, devoid of characteristic odor, and musty. *Powdered cayenne pepper*, adulterated with cracker dust and artificially colored. *Oil of sassafras*, of low specific gravity and low refractive index. *Sulphide of antimony*, composed of carbon, calcium phosphate, and traces of antimony. *Quevenne's iron* (imported in small bottles), containing only 19.6 per cent. of reduced iron. Other unsatisfactory drugs were: *Precipitated sulphur*, *powdered hydrastis* and *powdered sanguinaria*.

The Committee on Pharmacy and New Remedies reports quite an extensive list of new remedial agents, alphabetically arranged, with brief definitions.

The following papers were read:

"Insects Injurious to Drugs," by L. E. Sayre.

"A Microscopical Study of Capsicum," by W. F. Leech and L. E. Sayre.

"Elixir Magnesii Sulphatis," by Dr. Herring.

"Acetylene Gas," by W. G. Ingham.

"Old Preparations and their Value," by H. W. Mehl.

"Echinacea Root," by D. C. Kirkland.

"Sanitary Chemical Analysis of Water at the University of Kansas," by Edward Bartow.

"Testing of Diastase," by Joseph P. Murray.

"Granulated Opium," by Herman B. Kohl and L. E. Sayre.

"The Decadence of the Secret Formulary," by L. E. Sayre.

Kentucky.—The twenty-first annual meeting of the Kentucky Pharmaceutical Association was held at Tatham Springs, June 21, 22, 23, 1898. Oscar C. Dilly, of Louisville, was elected president; J. W. Gayle, of Frankfort, secretary.

The following papers were read:

"Why All Druggists of the State Should be Members of the Kentucky Pharmaceutical Association, etc.;" two papers, by J. W. Gayle and by R. M. McFarland.

"Is it to the Druggist's Interest to Manufacture a Line of Popular Remedies or Buy them from Some Non-Secret House," by Chas. G. Morris.

"A Plan to Prevent Cutting," "The Cut-Rate Evil," and kindred topics; four papers: by Addison Dimmit, by Chas. G. Morris, by W. S. Johnson, and by R. M. McFarland.

"National Formulary Preparations," by Henry W. Preissler.

"Peppermint Culture," by Gordon L. Curry.

"Practical Means of Handling and Storing Surgical Dressings," by Chas. G. Morris.

"The Retail Druggist. His Position Scientifically and Commercially a Quarter of a Century Ago and His Condition To-Day," by Henry A. Fabra.

"How Can We Increase Interest in the Kentucky Pharmaceutical Association?" by R. M. McFarland.

Georgia.—The twenty-third annual meeting of the Georgia Pharmaceutical Association was held in Brunswick, June 14 and 15, 1898. Chas. O. Tyner, of Atlanta, was elected president; Campbell T. King, of Macon, secretary. The report of the Georgia State Board of Pharmacy submits the results of the examination of a large number of drugs, which is particularly interesting since it shows a remarkable uniformity in the quality of the *cream of tartar* dispensed in the State of Georgia, and a very satisfactory condition of the drugs and preparations dispensed, in so far as can be judged from the examples given. Thus out of a total of 89 samples of *cream of tartar* only six fell below the pharmaceutical standard (= 99 per cent.) One of these six was also practically pure, three were low-grade cream of tartar, and the remaining two were not cream of tartar at all. Out of 123 samples of *laudanum*, eleven were subjected to

assay. Only one of them fell short in the official morphine percentage. Two samples of *paregoric* fell short of the official requirements. *Castor oil* was found to meet the U. S. Pharm. tests fully.

The following paper was read :

"What is the Best Process for Making Benzoinated Lard," by Max Morris.

Maine.—The thirty-first annual meeting of the Maine Pharmaceutical Association was held at Portland, July 7 and 8, 1898. W. A. Robinson, of Auburn, was elected president ; M. L. Porter, M. D., Danforth, secretary. The Committee on College of Pharmacy reports "Abstracts on Thesis Work Done by Department of Pharmacy, University of Maine, Spring Term, 1898," as follows :

"Examinations of Pepsins Claiming to be of U. S. Pharm. (1890) Strength," by F. W. Bailey and E. D. Walter.

"Examination of the Official Bromides," by W. E. MacDougall.

"Adulterations of Certain Powdered Drugs," by F. E. Hall.

"Sweet Spirit of Nitre—Assay of Market Samples," by H. A. Alden.

The following papers were read :

"The Early History of Chemistry," by Elbern T. Bowers.

"Is the Druggist of To-day Employing to the Best Advantage His Pharmaceutical Knowledge and Training?" by S. R. Crabtree.

"Progressive Pharmacy," by R. T. Tanner.

"Best Mode of Advertising a Drug Store," by Samuel R. Crabtree.

"Paper" (outlining a course of study for an apprentice, etc.), by T. L. Lord.

"The Prescription Business of Maine," by Noble C. Earl.

"To What Extent Should a Druggist do His Own Manufacturing?" by Earnest Jordan.

Maryland—The sixteenth annual meeting of the Maryland State Pharmaceutical Association was held at Blue Mountain, June 21–24, 1898. Robert S. McKinney, of Taneytown, was elected president ; Charles H. Ware, of Baltimore, secretary.

The Report on the Progress of Pharmacy, by Alfred R. L. Dohme, briefly reviews some of the more interesting discoveries and observations during the past year.

A Committee on Formulas reported on some formulas submitted in a previous report by the Committee on Pharmacy. These formulas are regarded as improvements on such as are now official in the U. S. Pharm., or are given in the National Formulary. Their titles are as follows: *Elixir of the Phosphates of Iron, Quinine and Strychnine ; Elixir of Pyrophosphate of Iron with Phosphates of Quinine and Strychnine ; Elixir of Pepsin, Bismuth and Strychnine ; Syrup of Iodide of Iron ; Syrup of Tar ; Benzoinated Lard ; Brown Mixture.*

The following papers were read :

"Assay of Tincture of Nux Vomica," by Louis Schulze.

"Saturated Solution of Potassium Iodide," by H. P. Hynson.

"Purity of Oil of Peppermint," by Louis Schulze.

"The Chemistry of Digitalis," by A. R. L. Dohme.

"The Chemistry of Aloes," by A. R. L. Dohme.

"The American Pharmaceutical Association. Reasons for joining it," by Webb Foster.

Massachusetts.—The seventeenth annual meeting of the Massachusetts State Pharmaceutical Association was held at Greenfield, June 14, 15 and 16, 1898. James J. Curran, of Holyoke, was elected president; James F. Guerin, of Worcester, permanent secretary.

The very copious report of the Committee on Adulteration and Sophistication covers so large a field that it is impracticable to review it here. It embraces a long list of chemicals obtained from wholesalers, and a similar one from retailers.

The following papers were read:

"Results of Examination of Market Sample, of Kamala and Ulmus," by Miss Marion Cowan.

"Suggestions Relative to the Official Syrups," by Chas. F. Nixon.

"Is it desirable to Favor the Suggestion to Restrict the Sales of Liquors by Pharmacists to Prescriptions only?" By Max Cramer.

"Methyl versus Ethyl Hydrate," by A. H. Benhard.

"Restrictive Legislation," by W. H. Bartlet.

"Pharmaceutical Investigations," by Prof. E. H. La Pierre.

"Notes" (on Fluid Extracts, Spirit of Nitrous Ether, Wine of Beef and Iron, Aromatic Waters, Hydrogen Peroxide, Glycerin as a Substitute for Syrup), by Wilbur L. Scoville.

"What Relation Does the Commercial Powdered Extract of Licorice Sustain to the Extractum Glycyrrhizæ of the U. S. P.?" by E. L. Patch.

"The Manufacture of Pills," by E. P. Copleston.

Michigan.—The sixteenth annual meeting of the Michigan State Pharmaceutical Association was held at Port Huron, August 2–3–4, 1898. John J. Sourwine, of Escanaba, was elected president; Charles F. Mann, of Detroit, secretary.

The Committee on Adulterations reported on the condition of numerous samples of *chlorinated lime* in packages, and found none of them to come up to pharmacopœial requirements. Samples of chlorinated lime in bulk, which assayed during winter, while fresh, 37 per cent. available chlorine, assayed only 28 to 30.5 per cent in July. *Spirit of nitrous ether* of the market in nine samples was with a single exception deficient, and in most cases woefully so. *Jalap*, in eight samples, yielded from 6.75 to 10.33 per cent. of resin, the official requirement being not less than 12 per cent. *Reduced iron* and *dilute hydrocyanic acid* were also found in very unsatisfactory condition.

The following papers were read:

"Some Notes on Adulteration of Drugs and Composition of Various Compounds," by C. C. Sherrard.

"The Chemical Examination of Wines," by A. B. Lyons.

"Side Lines in a Drug Store," by L. Pauly.

"Photo Supplies as a Side Line in a Drug Store," by E. E. Calkins.

"Advertising," by Dr. G. I. Ward.

"Advertising a Retail Drug Store," by B. Schrouder.

"A Plan to Re-organize the Retail Druggists of Michigan," two papers, by Charles F. Mann and by L. Pauly.

"Random Thoughts on Perfumes," by A. S. Parker.

"How to Make a Soda Water Fountain Pay," two papers, by H. C. Knill and by George J. Ward.

"How to Keep Plasters," by H. C. Knill.

"Some Things a Botanist Would See in Honolulu," (A City of Palms; Indigenous Plants Seldom Seen; Natural Wrapping Paper; A Bony Banana; Fruit Trees; A Lawyer Without a Brief; Some Shade Trees; The American Carob Tree, Algaroba; Scarcity of Wild Flowers; A Gay Usurper; Garden Flowers; Nature as an Artist in Color; Trees are in it Too), by A. B. Lyons.

Minnesota. — The fourteenth annual meeting of the Minnesota State Pharmaceutical Association was held at St. Paul, June 15 and 16, 1898. C. T. Heller, of St. Paul, was elected president; H. Rauch, of Minneapolis, secretary.

The following papers were read:

"Our Condition," by H. H. Meyer.

"Is it Within the Domain of the Pharmacist to Engage in the Work of Chemical Microscopy, and if so, Does it Pay?" by Frederick J. Wulling.

"The Preservation of Nutmegs," by Frederick J. Wulling.

"Inferior Mercurial Ointment," by Frederick J. Wulling.

"Sound Policies in Buying Goods," by H. W. Réetzke.

"The Advantage of Stock-Taking Once a Year," by Matt. H. Wittich

"The College of Pharmacy of the University of Minnesota—Historical, Continued from Last Year," by Prof. F. J. Wulling.

"The Minnetonka Meeting and Minnesota Pharmacy," by Frederick J. Wulling.

"The Cutter," by H. C. Kruckeberg.

"Powdered Drugs," by F. J. Wulling.

"Should the Pharmacy Law be so Amended that only Graduates of Accredited Colleges be Admitted to Examination?" by C. Stuart Burrows.

"Prescriptions and Dispensing," by Alex. Richards.

Missouri.—The twelfth annual meeting of the Missouri Pharmaceutical Association was held at St. Louis, June 7, 8, 9, 10 and 11, 1898. T. A. Mosley, of Harrisonville, was elected president; H. M. Whelpley, of St. Louis, secretary.

The Committee on Adulterations report *borax* grossly adulterated with sodium carbonate; *ammonia water* deficient in strength; *cream of tartar* containing no potassium bitartrate, or otherwise grossly adulterated; *copaiba* adulterated with gurjun balsam; *powdered asafetida* containing 85 per cent. of insoluble matter, chiefly calcium carbonate. Of eight samples of *syrup of ferrous iodide*, two contained a little over 3 per cent., one contained 6.4 per cent. and the remainder from 9.3 to 10 per cent. of ferrous iodide. *Syrup of hydriodic acid*, in four samples, was of satisfactory quality, as was also *sodium phosphate* and *bismuth subnitrate*, each in several examples.

The following papers were read:

"Experience a Teacher," by Wm. Mittelbach.

"The Commercial Side of Pharmacy," by Wm. Mittelbach.

"Commercial and Scientific Pharmacy," by Fred. R. Dimmitt.

"How to Successfully Conduct a Retail Drug Store," by Fred. R. Dimmitt.

"Valuable Hints for a Retail Pharmacist," by Otto F. Claus.

"Pharmaceutical Observations and Comments," by Wm. C. Bohn.

"The Metric System in 342,000 Prescriptions," by H. M. Whelpley.

"Some Commercial Aspects of Pharmacy," by J. M. Good.

"Extractum Colocynthidis," by G. H. Chas. Klie.

"A So-called Specially Refined Borax," by Carl G. E. Klie.

"An Antiseptic Solution," by H. F. Hassebrock.

"A Pleasant Aromatic Fluid Extract of Cascara Sagrada and How to Advertise it," by Francis Hemm.

"The Pharmacist as an Analyst," by Ambrose Mueller.

"The Retail Pharmacist and His Show Windows," by R. S. Vitt.

"Improved Formula for Mistura Chlorali et Potassii Bromidi Composita, National Formulary," by H. F. Hassebrock.

Nebraska.—The seventeenth annual meeting of the Nebraska State Pharmaceutical Association was held at Omaha, September 5and 6, 1898. E. K. Seykora, of South Omaha, was elected president; Belle C. Heilman, of Sterling, secretary.

The following papers were read:

"On Chemistry," by N. P. Hansen.

"How Best to Secure and Retain the Physician's Support," by Geo. W. Moore.

New Hampshire.—The twenty-fifth annual meeting of the New Hampshire Pharmaceutical Association was held at the Isle of Shoals, September 6 and 7, 1898. Goodwin E. Philbrick, of Portsmouth, was elected president; Frank L. May, of Manchester, secretary. The only paper read at this meeting was,

"On Adulteration," by Charles A. Tufts.

New Jersey.—The twenty-eighth annual meeting of the New Jersey

Pharmaceutical Association was held at Summit, May 18 and 19, 1898. William T. Brown, of Madison, was elected president; Frank C. Stutzlen, of Elizabeth, secretary.

The following papers were read:

"Medicinal Plants Found in New Jersey, With Special Reference to Those Growing in the Vicinity of Summit," by H. H. Rusby, M. D.

"The Philippine Islands and Their Products," by Clement B. Lowe, M. D.

"Notes on Pharmaceutical Preparations" (Syrup of Tolu, Aromatic Spirit of Ammonia), by William C. Alpers.

"Whither Are We Drifting?"

"List of New Remedies."

New York.—The twentieth annual meeting of the New York State Pharmaceutical Association was held at Rochester, June 28, 29, 30 and July 1, 1898. William Muir, of Brooklyn, was elected president; Judson B. Todd, of Ithaca, secretary.

The Committee on New Remedies presented a lengthy list embodying probably all the new remedies which had been introduced during the past few years. The Committee on Adulterations reported on the condition of a number of preparations procured in different samples and examined by them. In ten samples of *tinctura opii* only three contained a percentage of morphine approximating to the official requirement, the other seven containing from 0.56 to 0.98 per cent. Other preparations examined and found more or less unsatisfactory were: *spirit of nitrous ether*, *compound spirit of ether*, *aqua ammoniæ*, *syrup of ferrous iodide*, *tincture of iodine*, *chlorine water*, *mercurial ointment*, *and distilled water*. *Liquor plumbi subacetatis* and *ether* were in the main found to be of satisfactory quality; on the other hand, a brand of *creosote*, labeled "Creosote, German," which was supposed to be true beechwood-tar creosote, was found in 50 per cent. of all the samples examined to be simply carbolic acid of doubtful purity.

The following papers were read:

"Cocaine Muriate," by F. P. Tuthill.

"The Selection of Strophanthus Seeds," by F. P. Tuthill.

"A Uniform Standard for Pharmaceutical Registration," by Albert H. Brundage.

"The Position of Pharmacy," by Prof. William C. Anderson.

"Powdered Drugs in the Pharmacopœia of 1900," by Prof. H. H. Rusby.

"Tests for Sugar and Albumin in Urine," by William C. Alpers.

"That Dry Subject, Botany," by E. Clayton Woodcock.

North Dakota.—The thirteenth annual meeting of the North Dakota State Pharmaceutical Association was held at Fargo, August 9, 10, 11,

1898. C. J. Lee, of Valley City, was elected president; W. S. Parker, Lisbon, secretary.

The following paper was read:

"The Retail Druggist and the War Tax," by H. L. Haussamen.

Ohio.—The twentieth annual meeting of the Ohio State Pharmaceutical Association was held at Columbus, June 7, 8, 9, 1898. J. H. Beal, of Scio, was elected president; Lewis C. Hopp, of Cleveland, permanent secretary.

The Committee on Unofficial Formulas reported favorably on a recommendation to the Committee on National Formulary of the American Pharmaceutical Association to embody in the National Formulary certain formulas, designated by numbers, from the Cincinnati Academy of Pharmacy Formulary.

The following papers were read:

"A Modern Emulsifying Agent," by Prof. H. V. Arny.

"The Practicability of Volumetric Tests for Pharmacists," by Prof. J. Feil.

Pennsylvania. — The twenty-first annual meeting of Pennsylvania Pharmaceutical Association was held at Buena Vista Spring Hotel, June 20, 22, 23, 24, 1898. Mahlon N. Kline, of Philadelphia, was elected president; Jacob A. Miller, of Harrisburg, secretary.

The Committee on Adulteration reported on the substitution—in a single case—of a 100 lb. keg of sodium bicarbonate for *powdered borax;* also on several samples of unsatisfactory *extract of cannabis indica*, and a lot of *German carbolic acid* containing much cresol as impurity.

The following papers were read:

"Can a Fuller Knowledge of Pharmacy be Disseminated among Physicians," by D. J. Thomas.

"Cheaper Solvents for the Extraction of Active Drug Principles," by F. W. E. Stedem.

"Chemistry of Aloes." by Dr. A. R. L. Dohme.

"Influence of Drugs Upon History and Civilization," by Dr. C. B. Lowe.

"Laboratory Notes" (Oil of Sassafras; Milk Sugar), by Messrs, LaWall and Pursel.

"Manufacture of Proprietary Articles by the Association," by J. F. Patton.

"Ownership of Drug Stores," by C. T. George.

"Plan to prevent Cutting of Prices of Proprietary Medicines," by Dr. W. H. Reed.

"Saffron," by Henry Kraemer.

"Sale of Poisons," by L. Emanuel.

"Should the Pharmacy Board Publish the Examination Questions?" By L. Emanuel.

"Volatility of Some of the Newer Remedies," by Prof. Frank X. Moerk.

South Dakota.—The thirteenth annual meeting of the South Dakota State Pharmaceutical Association was held at Mitchell, August 9, 10, 11, 1898. C. H. Lohr, of Estelline, was elected president; E. C. Bent, of Dell Rapids, secretary.

The following papers were read:

"Sundries," by John M'Clain.

"Tinctures and Fluid Extracts," by H. P. Pettigrew.

"The Manufacturing Pharmacist," by H. P. Pettigrew.

"The Microscope and its Use in Pharmacy," by D. F. Jones.

"Qualifications for a Drug Clerk," by J. H. Pettibone.

"Preliminary Education," by Jas. Lewis.

"Acetylene Gas as a Light," by N. J. Bleser.

Vermont.—The fifth annual meeting of the Vermont State Pharmaceutical Association was held at Montpelier, October 25 and 26, 1898. W. E. Terrill, of Montpelier, was elected president; Wilfred F. Root, of Brattleboro, secretary. The feature of this meeting was an address on

"Pharmacy, Past, Present and Future," by Professor A. B. Huested.

Virginia.—The seventeenth annual meeting of the Virginia Pharmaceutical Association was held at Natural Bridge, July 19, 20, 21, 1898. Charles G. Maphis, of Charlottesville, was elected president; C. B. Fleet, of Lynchburg, secretary.

The Committee on Adulterations reported on a number of preparations and chemicals which were found to be unsatisfactory in quality. These included: *Tincture of opium, tincture of nux vomica, tincture of belladonna, spirit of nitrous ether.*

The following papers were read:

"To What Extent is a Pharmacist Justified in Pushing His Own Preparations?"

"Chemical Constitution of Nitrogenous Organic Compounds," by Wm. R. Jones.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1898, TO JULY 1, 1899.

	Annual Dues.	Certificates.
Adamick, Gustave H.....'99	$5 00	
Aimar, Charles P.....'98	5 00	
Allen, E. Floyd.....'98-'99	10 00	
Allen, John H.....'98	5 00	
Allison, William O.....'99	5 00	
Alpers, William C.....'99	5 00	
Alpers, William H.....'98	5 00	
Amend, Bernard G.....'99	5 00	
Amend, Otto P.....'98	5 00	
Anderson, Samuel.....'98	5 00	
Andriessen, Hugo 98	5 00	
Ardery, Lorimer .....'99	5 00	
Argenti, Jerome J. B.....'98	5 00	
Arnold, Charles F.....'98	5 00	
Arrington, Homer H.....'98	5 00	
Asplin, John H.....'96	5 00	
Aughinbaugh, David C...'98-'99	10 00	
Axness, Ole M.....'98	5 00	
Bailey, Frederick.....'99	5 00	
Baird, Julian W.....'99	5 00	
Baker, Edwin .....'99	5 00	
Baker, T. Roberts.....'99	5 00	
Ball, Charles E.....'99	5 00	
Ballard, John W .....'99	5 00	
Balser, Gustavus .....'99	5 00	
Banner, John .....'98	5 00	
Baridon, Louis R.....'99	5 00	
Baril, Joseph B.....'96-'97-'98	15 00	
Bartells, George C .....'98	5 00	
Barth, George F.....'98	5 00	
Bartley, Elias H .....'99	5 00	
Base, Daniel.....'98	5 00	
Bassett, Charles H.....'97-'98	10 00	
Baur, Jacob .....'97-'98-'99	15 00	
Baylis, Lewis F.....'99	5 00	
Bayly, Charles A. .....'96	5 00	
Beal, James H.....'99	5 00	
Becker, Charles L..... '98-'99	10 00	
Behrens, Paul J.....'98-'99	10 00	
Beitenman, William W.....'99	5 00	
Bell, S. Howard.... .....'99	5 00	
Belt, James F.....'98	5 00	
Benfield, Charles W.....'98-'99	10 00	
Berryhill, Henry P.....'99	5 00	
Betzler, Jacob.....'98	5 00	
Beyschlag, Charles.....'99	5 00	
Billings, Henry M .....'98	5 00	
Bingham, Charles C.....'98	5 00	
Bingham, William E.....'98	5 00	
Birdsong, Edwin G.....'98	5 00	
Bishop, Samuel E .....'98	5 00	
Blackmore, Henry S.....'98	5 00	
Blaikie, William.....'99	5 00	
Blake, James E.....'98	5 00	
Blakely, George C.....'96-'97	10 00	
Blanding, William O.....'99	5 00	
Blank, Alois.....'98	5 00	
Bley, Alphonso A. W....'98-'99	10 00	
Bloomstein, Max.....'97-'98	10 00	
Amount carried forward.....	$360 00	

	Annual Dues.	Certificates.
Amount brought forward	$360 00	
Blumauer, Louis .....'98	5 00	
Bobbitt, James H .....'98	5 00	
Bodemann, Wilhelm.....'94	5 00	
Boeddiker, Otto .....'98-'99	10 00	
Boehm, Solomon .....'98	5 00	
Boerner, Emil L.....'96-'97-'98	15 00	
Bohn, Carl H.....'98	5 00	
Bond, John B.....'98	5 00	
Boyce, Samuel F.....'98-'99	10 00	
Boyd, George W.....'98	5 00	
Boyden Edward C.....'98-'99	10 00	
Boynton, Herschell.....'97-'98	10 00	
Brack, Charles E.....'98	5 00	
Bradbury, Wymond H..... '98	5 00	
Bradley, Theodore J.....'99	5 00	
Braunwarth, Alice L.....'99	5 00	
Brecht, Frederick A.....'99	5 00	
Breck, Frederick W.....'98	5 00	
Brewer, John W.....'98	5 00	
Brickman, Arthur O.....'98-'99	10 00	
Briggs, Andrew G.....'98	5 00	
Brigham, Laurence S .....'98	5 00	
Brisley, Harry .....'98	5 00	
Broe, James A.....'98	5 00	$7 50
Brooks, George W.....'98-'99	10 00	
Brown, Albert E.....'98	5 00	
Brown, William A.....'99	5 00	
Bruck, Philip H.....'99	5 00	
Brundage, Albert H.....'98-'99	10 00	
Brunner, Charles H.....'98	5 00	
Brunner, Norman I .....'98	5 00	
Buchheit, Aug. W.....'98-'99	10 00	
Buck, John L.....'97-'98	10 00	
Bunker, Elihu .....'98	5 00	
Burgess, William G.....'98	5 00	
Burgheim, Jacob ....'98-'99	10 00	
Burnham, Alfred A. Jr.....'99	5 00	
Burns, Edwin M.....'98	5 00	
Burrough, Horace.....'99	5 00	
Butler, Charles H.....'99	5 00	
Butler, Freeman H.....'99	5 00	
Button, Charles E.....'99	5 00	
Byrne, John .....'99	5 00	
Cambier, Jacob .....'98	5 00	
Cameron, Donald L .....'98	5 00	
Capper, William E.....'96-'97	10 00	
Carlson, Swan B.....'98	5 00	
Carpenter, Alfred B.....'98	5 00	
Carrell, Eugene A.....'98	5 00	
Carter, Frank H.....'98	5 00	
Case, Charles H.....'98	5 00	
Caspari, Charles Jr.....'99	5 00	
Caspari, William Jr.....'98	5 00	
Casper, Thomas J.....'99	5 00	
Chabot, David P.....'99	5 00	
Chandler, Charles F.....'99	5 00	
Chapin, Fred. H.....'98	5 00	
Chapin, William A.....'99	5 00	
Amount carried forward.....	$715 00	$7 50

	Annual Dues.	Certificates.
Amount brought forward	$715 00	$7 50
Chapman, Isaac C ..... '98	5 00	
Charroppin, Emile L ..... '99	5 00	
Cheatham, Thomas A .... '98-'99	10 00	
Christiani, Charles ..... '98	5 00	
Christianson, Lars ..... '99	5 00	
Clark, James R ..... '99	5 00	
Clark, John A ..... '98	5 00	
Cliffe, William L ..... '98	5 00	
Cline, Raoul R. D ..... '98	5 00	
Cobb, Ralph L ..... '98-'99	10 00	
Coblentz, Virgil ..... '98	5 00	
Cole, Howson W ..... '98	5 00	
Cole, Victor L ..... '99	5 00	
Collins, Albert B ..... '99	5 00	
Conrath, Adam ..... '99	5 00	
Cook, Thomas P ..... '99	5 00	
Cornell, Edward A ..... '98	5 00	
Corning, Albion J ..... '98	5 00	
Cotton, William H ..... '97-'98	10 00	
Cramer, Max ..... '99	5 00	
Crampton, Ferd L ..... '99	5 00	
Crane, Frank T ..... '98	5 00	
Criswell, Francis M ..... '98	5 00	
Crossman, George A ..... '95	5 00	
Crowdle, John E ..... '98	5 00	
Culbreth, David M. R ..... '99	5 00	
Curry, David W ..... '98-'99	10 00	
Cutts, Foxwell C ..... '99	5 00	
Dadd, Robert M ..... '99	5 00	
Danek, John F ..... '98-'99	10 00	
Danforth, Edmund C. '96-'97-'98	15 00	
Dare, Charles F ..... '98	5 00	
Davies, Llewellyn P ..... '99	5 00	
D'Avignon, J. Eugene ..... '98	5 00	
Davis, Charles L ..... '99	5 00	
Davis, William M ..... '98	5 00	
Dawson, Edward S. Jr .'97-'98-'99	15 00	
Dawson, John H ..... '98	5 00	
Day, William B ..... '98	5 00	
De Lang, Alfred ..... '98	5 00	
De Lorenzi, Albert ..... '98	5 00	
De Reeves, A. Eugene ..... '98	5 00	
Decary, Louis ..... '96-'97	10 00	
Depeyre, Louis N ..... '96	5 00	
Dewender, William H ..... '99	5 00	
Dewoody, William L ..... '98	5 00	
Diebert, Thomas I ..... '98	5 00	
Diehl, C. Lewis ..... '98	5 00	
Dickman, George C ..... '98-'99	10 00	
Dill, J. Byron ..... '96	5 00	
Dilly, Oscar C ..... '98	5 00	
Dimock, Robert H ..... '99	5 00	
Dixon, J. Marion ..... '99	5 00	
Dobbins, Edward T ..... '99	5 00	
Douglass, Henry ..... '98	5 00	
Douglass, Stephen W ..... '98	5 00	
Drake, Frederick T ..... '98	5 00	
Dreiss, James E ..... '98	5 00	
Dresser, George E ..... '96-'97-'98	15 00	
Drew, Walter I ..... '98	5 00	
Druehl, Frank A ..... '98	5 00	
Duble, Jesse B ..... '98	5 00	
Duckett, Walter G ..... '98	5 00	
Duggan, James ..... '98	5 00	
Dunn, John A ..... '99	5 00	
Dunwody, Richard G ..... '96-'97	10 00	
Durban, Sebastian C ..... '96	5 00	
Durkee, William C ..... '98	5 00	
Dutcher, Alfred L ..... '98-'99	10 00	
Eads, Robert I ..... '98	5 00	
Eagny, James T ..... '99	5 00	
Easterday, Herbert C ..... '98	5 00	
Eberle, Eugene G ..... '98-'99	10 00	
Eccles, Robert G ..... '99	5 00	
Eckstein, Andrew J 99	5 00	
Amount carried forward	$1170 00	$7 50

	Annual Dues.	Certificates.
Amount brought forward	$1170 00	$7 50
Eddy, Henry C ..... '97-'98	10 00	
Edwards, Frederick B ..... '98	5 00	
Eger, George ..... '96-'97-'98	15 00	
Eggers, Frederick H .'97-'98-'99	15 00	
Ehrlicher, Henry M ..... '98	5 00	
Eichroct, Charles W ..... '98	5 00	
Eliel, Leo ..... '98	5 00	
Emanuel, Louis ..... '99	5 00	
Eppley, James K ..... '98	5 00	
Erb, Charles S ..... '98	5 00	
Ernst, Frank F ..... '97-'98	10 00	
Esters von Krakau, W ..... '98	5 00	
Etzel, John L ..... '98-'99	10 00	
Evans, Joseph S ..... '98	5 00	
Ewell, Ervin E ..... '98	5 00	
Ewing, John ..... '98	5 00	
Ewing Mary S ..... '98	5 00	
Eyssell, George 99	5 00	
Fairchild, Benjamin T ..... '99	5 00	
Fairchild, Samuel W ..... '99	5 00	
Faulkner, Garland E ..... '98	5 00	
Feidt, George D ..... '98-'99	10 00	
Feil, Joseph ..... '98	5 00	
Fenner, Alexander W., Jr ... '98	5 00	
Fieber, Gustavus A ..... '98-'99	10 00	
Field, Claud ..... '98	5 00	
Field, William C ..... '98	5 00	
Fink, Frederick Wm ..... '99	5 00	
Firmin, John C ..... '98	5 00	
Fischer, Oscar F ..... '96-'97	10 00	
Fish, Charles F ..... '98	5 00	
Fisher, Elbert E ..... '98	5 00	
Flemer, Lewis ..... '98	5 00	
Fletcher, John W ..... '99	5 00	
Flexon, Charles ..... '98	5 00	
Flint, George B ..... '98-'99	10 00	
Foster, Charles E ..... '98	5 00	
Fouch, William M ..... '98	5 00	
Foulke, James ..... '98	5 00	
Fox, Peter P ..... '99	5 00	
Frames, J. Fuller ..... '98	5 00	
Frank, Hermann O ..... '98-'99	10 00	
Fraser, Horatio N ..... '99	5 00	
Frauer, Herman E ..... '98	5 00	
Freid, Isadore ..... '98-'99	10 00	
French, Harry B ..... '99	5 00	
French, John I ..... '99	5 00	
Frost, William A ..... '98	5 00	
Frye, George C ..... '99	5 00	
Galt, Edward P ..... '96	5 00	
Gamble, Stewart ..... '98	5 00	
Gammon, Irving P ..... '98	5 00	
Gane, Eustace H ..... '98	5 00	
Gano, William H ..... '99	5 00	
Gardner, Robert W ..... '99	5 00	
Gayle, John W ..... '99	5 00	
Geiger, Charles F ..... '97-'98	10 00	
Geisler, Joseph F ..... '98	5 00	
George, Charles T ..... '98-'99	10 00	
Gessner, Emil A ..... '99	5 00	
Getty, Wilmot S ..... '97-'98	10 00	
Gill, George ..... '99	5 00	
Gilpin, Henry B ..... '99	5 00	
Gleim, John C ..... '99	5 00	
Glover, William H ..... '98	5 00	
Godbold, Fabius C ..... '98	5 00	
Goldsborough, Charles H .... '98	5 00	
Good, James M ..... '98	5 00	
Goodale, Harvey G ..... '98	5 00	
Goold, Joseph E ..... '99	5 00	
Gorgas, George A ..... '99	5 00	
Gosman, Adam J ..... '99	5 00	
Grace, William D ..... '99	5 00	
Graham, Frank R ..... '98	5 00	
Grambois, Augustin ..... '96	5 00	
Amount carried forward	$1625 00	$7 50

	Annual Dues.	Certificates.
Amount brought forward	$1625 00	$7 50
Grassly, Charles W.....'98	5 00	
Gray, Henry R .....'98	5 00	
Greene, William R.....'98–'99	10 00	
Gregorius, George.....'98	5 00	
Gregory, Willis G....'96–'97–'98	15 00	
Greiner, William E .....'98–'99	10 00	
Greve, Charles M.....'98–'99	10 00	
Greyer, Julius.....'98	5 00	
Grossman, Edward L.'96–'97–'98	15 00	
Guerin, James F .....'98	5 00	
Guise, P. Nettleton.....'98	5 00	
Gundrum, George.....'99	5 00	
Haake, William H.....'98–'99	10 00	
Hall, Edwin B.....'98–'99	10 00	
Hall, Horace B .....'98	5 00	
Hall, Robert E. L.....'98	5 00	
Hall, William A.....'98	5 00	
Hallberg, Carl S. N .....'98	5 00	
Hammar, Alrick .....'98–'99	10 00	7 50
Hammel, Joseph ... .'98	5 00	
Hancock, Franklin W....'96–'97	10 00	
Harbaugh, Wilson L.....'98–'99	10 00	
Hardin, John H.....'97–'98–'99	15 00	
Hargrave, Edward P .....'98	5 00	
Harris, Francis M.....'98	5 00	
Harrison, Wm. J.....'99	5 00	
Harter, Isaac F .....'09	5 00	
Hartshorn, Frederick A.....'99	5 00	
Hartwig, Otto J.....'98	5 00	
Hassebrock, Henry F .....'98	5 00	
Hassinger, Samuel E. R.....'99	5 00	
Hatton, Edgar M.....'99	5 00	
Hatton, Ellmore W.....'99	5 00	
Hauenstein, William.....'98–'99	10 00	
Haussamen, Henry L.....'98	5 00	
Haussmann, Frederick W....'99	5 00	
Hay, Charles L ....'98	5 00	
Hayes, Horace P.....'99	5 00	
Hayes, James H .....'98	5 00	
Haynes, David O .....'99	5 00	
Hays, Joseph A.....'98	5 00	
Hechler, George L .....'98	5 00	
Heddens, Claus H.....'97	5 00	
Hedley, Thomas A .....'96–'97	10 00	
Heebner, Charles F.....'98	5 00	
Heinemann, Otto.....'98	5 00	
Heinitsh, Sigmund W .....'99	5 00	
Helfman, Joseph.....'98–'99	10 00	
Heller, Charles T .....'98	5 00	
Hemm, Francis .....'98	5 00	
Henderson, Archibald K ....'99	5 00	
Henry, Charles (Dworniczak)'98	5 00	
Henry, Charles L .....'98	5 00	
Henry, Frank C.....'98	5 00	
Hepburn, John .....'98–'99	10 00	
Herbst, William P.....'98	5 00	
Hereth, Frank S .....'98	5 00	
Heschong, John F.....'98–'99	10 00	
Hess, Paul L.....'97–'98	10 00	
Heydenreich, Emile .....'99	5 00	
Hickerson, William H ...'98–'99	10 00	
Hicks, Henry T.....'98	5 00	
Higby, William H .....'98	5 00	
Hill, Frederick J .....'98	5 00	
Hilton, Samuel L.....'98	5 00	
Hinrichs, Gustavus D.....'98	5 00	
Hiriat, Sebastian.....'98	5 00	
Hitchcock, John E .....'98	5 00	
Hoffman, Julius .....'98	5 00	
Hogan, John J.....'99	5 00	
Holland, Samuel S.....'96–'97	10 00	
Hood, Charles I. .....'99	5 00	
Hopkins, Jesse L.....'98	5 00	
Hopp, Lewis C.....'98	5 00	
Hover, William A.....'99	5 00	
Amount carried forward	$2110 00	$15 00

	Annual Dues.	Certificates.
Amount brought forward	$2110 00	$15 00
Howey, John J.....'98	5 00	
Howson, Arthur B.....'98	5 00	
Hoyt, George M.....'98–'99	10 00	
Huder, Henry J.....'98	5 00	
Hudson, Arthur .....'98	5 00	
Huested, Alfred B .....'99	5 00	
Huhn, George .....'98	5 00	
Huntington, William H..'98–'99	10 00	
Hurd, John C.....'99	5 00	
Hurlebaus, George W.....'98	5 00	
Huston, Charles .....'99	5 00	
Hutton, Harry D.....'98	5 00	
Hydren, Carl.....'98–'99	10 00	
Hynson, Henry P .....'98–'99	10 00	
Ingalls, John.....'98	5 00	
Jelliffe, Smith E .....'97	5 00	
Jenkins, W. Edgar .....'98	5 00	
Joergensen, Sophus.....'98	5 00	
Joerger, Frederick .....'97–'98	10 00	
Johnson, Charles B .....'98–'99	10 00	
Johnson, D. Dudley .....'98	5 00	
Johnson, Louise L. (Mrs.)'98–'99	10 00	7 50
Johnston, Henry A.....'98	5 00	
Jones, Alexander H .....'99	5 00	
Jones, James T.....'98–'99	10 00	
Jones, Simon N .....'98	5 00	
Jungmann, Julius.....'98	5 00	
Kaczoroski, Adolph O .....'97	5 00	
Kalish, Julius ....'99	5 00	
Kammer, D. Alexander.....'98	5 00	
Karn, William A .....'98	5 00	
Kauffman, George B .....'99	5 00	
Keefer, Charles D .....'98	5 00	
Keenan, Thomas J .....'97–'98	10 00	
Keeney, Caleb R.....'99	5 00	
Kelley, Edward S .....'98	5 00	
Kelly, George A.....'98–'99	10 00	
Kelly, John I .....'98	5 00	
Kemp, Edward.....'99	5 00	
Kennedy, Ezra J.....'98	5 00	
Kennedy, George W.....'98	5 00	
Kerr, William W.....'96	5 00	
Kettler, Edward J.....'99	5 00	
Kiedaisch, John F. Jr.....'99	5 00	
Kieffer, George.....'98	5 00	
Kienth, Hans.....'98–'99	10 00	
Kilmer, Frederick B.....'99	5 00	
King, Campbell T .....'98–'99	10 00	
King, George A. N.....'98	5 00	
Kirchgasser, William C ..'98–'99	10 00	
Kirchhofer, Paul .....'96–'97–'98	15 00	
Kirk, James E .....'98	5 00	
Kirkland, Derwentwater ....'99	5 00	
Klayer, Louis .....'96–'97	10 00	
Klein, Ernst F.....'98–'99	10 00	
Klein, Frederick .....'98–'99	10 00	
Klie, G. H. Charles .....'98	5 00	
Kline, Charles G .....'96	5 00	
Kline, Mahlon N.....'99	5 00	
Klotz, August E.....'96	5 00	
Knabe, Gustavus A.....'98	5 00	
Knoebel, Thomas .....'99	5 00	
Knoefel, Charles D .....'98	5 00	
Knox, James W. T.....'98	5 00	
Koch, John A .....'97–'98	10 00	
Koch, Julius A.....'98	5 00	
Koch, Louis ....'99	5 00	
Kolb, William W.....'98–'99	10 00	
Kremers, Edward.....'98–'99	10 00	
Krick, Charles A.....'98	5 00	
Krieger, Philip.....'99	5 00	
Krueger, Owen W .....'98	5 00	
Kuder, William F .....'98	5 00	
La Pierre, Elie H ....'99	5 00	
La Wall, Charles H .....'98	5 00	
Amount carried forward	$2590 00	$22 50

	Annual Dues.	Certificates.
Amount brought forward	$2590 00	$22 50
Lachance, Seraphin ..'96–'97–'98	15 00	
Laird, John.....'99	5 00	
Lamar, Henry J.....'98–'99	10 00	
Lampa, Robert R.....'98	5 00	
Lanctot, Henri.....'98	5 00	
Lane, Edward B.....'98–'99	10 00	
Larrabee, John.....'98–'99	10 00	
Lauricella, Felice ..... '98	5 00	
Layton, Thomas .....'98	5 00	
Legel, John G.....'99	5 00	
Legendre, Joseph A.....'98	5 00	
Lehman, Louis.....'98	5 00	
Lehr, Philip.....'98–'99	10 00	
Leis, George.....'96	5 00	
Leist, Jacob L.....'97–'98	10 00	
Lernhart, August.....'99	5 00	
Levinson, Joseph.....'99	5 00	
Levy, Adolph.....'98	5 00	
Lewis, Ernest G.....'96–'97–'98	15 00	
Lilly, Eli .....'98	5 00	
Lilly, Josiah K.....'98	5 00	
Lindeman, Harry F.....'98	5 00	
Lindvall, Gus..... '99	5 00	
Lloyd, John U.....'98–'99	10 00	
Lockert, Charles L.....'98	5 00	
Lockie, James A.....'98	5 00	
Loomis, John C.....'98	5 00	
Lord, Thomas .....'98	5 00	
Lovis, Henry C.....'98	5 00	
Lovvorn, James L.....'98	5 00	
Lowd, John C.....'99	5 00	
Lowe, Clement B.....'98	5 00	
Lowe, John W.....'98–'99	10 00	
Lowell, Edward M.....'99	5 00	
Lueder, Fritz .....'99	5 00	
Lundberg, John C.....'98	5 00	
Lynch, Frank K.....'98	5 00	
Lynch, Robert F.....'98	5 00	
Lyons, Albert B.....'98	5 00	
Lyons, Fred. W.....'98	5 00	
Lyons, Isaac L.....'98–'99	10 00	
MacNair, Whitmel H.....'98	5 00	
Macy, Sherman R.....'97–'98	10 00	
Maguire, Eduord S .....'98–'99	10 00	
Main, Thomas F.....'98–'99	10 00	
Maine, August.....'99	5 00	
Maisch, Henry.....'98	5 00	
Majer, Oscar.....'98	5 00	
Major, John R.....'98	5 00	
Mallinckrodt, Edward....'98–'99	10 00	
Mansfield, Samuel.....'98	5 00	
Maphis, Charles G.....'98	5 00	
Mares, Ferdinand L.....'99	5 00	
Markoe, George B.....'98	5 00	
Marshall, Ernest C.....'98–'99	10 00	
Martin, John C.....'98	5 00	
Martin, Nicholas H..... ...'99	5 00	
Mason, George L. .....'96	5 00	
Matthews, Charles E.....'99	5 00	
May, Charles C. .....'98	5 00	
May, Edward. .....'98	5 00	
May, Eugene .....'99	5 00	
Mayo, Caswell A....'97–'98–'99	15 00	
McDonald, George.....'98	5 00	
McElhenie, Thomas D.....'98	5 00	
McGeorge, William. .....'99	5 00	
McIntyre, Ewen .....'98–'99	10 00	
McIntyre, William.....'99	5 00	
McKesson, G. Clinton....'98–'99	10 00	
McKesson, John, Jr. .....'99	5 00	
McKinney, Robert S.....'98	5 00	
McLarty, Colin. .....'98	5 00	
McMonies, Thomas L. .....'98	5 00	
Mehl, Henry W. .....'97–'98	10 00	
Meissner, F. W. Jr.....'99	5 00	
Amount carried forward.....	$3075 00	$22 50

	Annual Dues.	Certificates.
Amount brought forward	$3075 00	$22 50
Menk, Charles W .....'98	5 00	
Mennen, Gerhard .....'98	5 00	
Merrell, Ashbel H.....'98	5 00	
Merrell, Charles G.....'99	5 00	
Merrell, George.....'99	5 00	
Michaelis, Gustavus.....'99	5 00	
Miller, Charles.....'98	5 00	
Miller, Emerson R.....'98	5 00	
Miller, Herman .....'98	5 00	
Miller, T. Ashby.....'99	5 00	
Miller, William H.....'98–'99	10 00	
Miner, Maurice A.....'98	5 00	
Mittelbach, William.....'99	5 00	
Mix, Willis L. .....'99	5 00	
Moerk, Frank X .....'98–'99	10 00	
Moore, John T.....'99	5 00	
Moore, Josh F..... ....'96	5 00	
Moore, Silas H.....'98	5 00	
Morris, Lemuel I.....'96–'97	10 00	
Morris, Max ....'98–'99	10 00	
Morse, Edward W.....'98	5 00	
Mosher, Wm. W.....'98	5 00	
Moulton, Daniel P.....'98	5 00	
Mueller, Adolph .....'99	5 00	
Mueller, Ambrose.....'98	5 00	
Mueller, Otto E. .....'98	5 00	
Mulcahy, Daniel D.....'98	5 00	
Mulford, Henry K.....'99	5 00	
Mumma, D. Edgar.....'99	5 00	
Murphy, John S.....'98	5 00	
Murray, Beni. L.....'98–'99	10 00	
Muth, George L.....'98–'99	10 00	
Muth, John C.....'98–'99	10 00	
Muth, John S... ..... '98–'99	10 00	
Myers, Daniel.....'99	5 00	
Myers, Preston B. .....'98–'99	10 00	
Nattans, Arthur.....'98	5 00	
Newman, George A.....'98	5 00	
Newton, Philo W.....'98	5 00	
Nichols, John C..... 98	5 00	
Nichols, Thomas B.....'98	5 00	
Nielson, John.....'99	5 00	
Nipgen, John A.....'99	5 00	
Noll, Martin J.....'98	5 00	
Nordmann, Herman .....'98–'99	10 00	
Norton, George E. .....'98	5 00	
O'Hare, James .....'98–'99	10 00	
O'Neil, Henry M.....'99	5 00	
Oberdeener, Samuel.....'98	5 00	
Ogier, John M.....'98–'99	10 00	
Ohliger, Lewis P.....97–'98	10 00	
Oliver, Wm. M.....'99	5 00	
Orton, Ingomar F. ..... .'98	5 00	
Osgood, Hugh H.....'99	5 00	
Osmun, Charles A.....'98	5 00	
Osseward Cornelius.....'99	5 00	
Otis, Clark Z.....'98	5 00	
Ottinger James J.....'99	5 00	
Otto, John N. W....'97–'98–'99	15 00	
Parisen, George W.....'98	5 00	
Parsons, John .....'99	5 00	
Partridge, Charles K.....98	5 00	
Partridge, Frank R.....'98	5 00	
Patch. Edgar L.....'98	5 00	
Pattison, George H.....'98	5 00	
Patton, John F.....'99	5 00	
Pauly, Frank C.....'98	5 00	
Peacock, Josiah C.....'98–'99	10 00	
Pearce, Howard A.....'99	5 00	
Pearman, William E..... .'98	5 00	7 50
Pearson, Joseph F.....'98	5 00	
Pease, Autumn V.....'98	5 00	
Pease, Francis M.....'99	5 00	
Peck, George L.....'99	5 00	
Pennock, Edward.....'98	5 00	
Amount carried forward	$3530 00	$30 00

	Annual Dues.	Certificates.
Amount brought forward	$3680 00	$30 00
Perkins, C. William .....'98	5 00	
Perry, Frederick W. R ..'97-'98	10 00	
Peter, Minor C.. .....'98	5 00	
Peters, John M .....'98	5 00	
Petsche, Bismarck W ....'97-'98	10 00	
Pfafflin, Henry A.....'98	5 00	
Pfeiffer, John ....'98	5 00	
Phillips, Carrie E..... .....'98	5 00	
Phillips, Charles W.....'98-'99	10 00	
Phillips, Edwin F .....'98	5 00	
Pieck, Edward L.....'98-'99	10 00	
Pierce, William H.....'99	5 00	
Pilson, Abram O.....'98-'99	10 00	
Pine, Warren C .....'98	5 00	
Plaut, Albert.....'99	5 00	
Plenge, Henry .....'98-99	10 00	
Porter, Chilton S .....'98	5 00	
Porter, Henry C .....'99	5 00	
Porter, Millett N.. .....'98	5 00	
Portmann, Caesar A.....'98	5 00	
Potter, William R .....'98	5 00	
Potts, David G .....'98-'99	10 00	
Powell, Wm. C.....'98	5 00	
Powell, William D.....'98	5 00	5 00
Power, Frederick B .....'98-'99	10 00	
Preissler, Henry W .....'98	5 00	
Prescott, Albert B.....'98	5 00	
Preston, David.....'99	5 00	
Price, Charles H .....'99	5 00	
Price, Joseph .....'99	5 00	
Prieson, Adolph ..... '99	5 00	
Priest, Carlton R.....'98	5 00	
Puckner, William A.....'98	5 00	
Punch, William F .....'96	5 00	
Purcell, Nicholas S.....'98	5 00	
Quackinbush, Benj. F .....'99	5 00	
Quandt, Arthur A .....'98-'99	10 00	
Quandt, Ernest E.....'98-'99	10 00	
Quayle, Thomas A .....'98	5 00	
Ramaley, Francis .....'99	5 00	
Rand, Daniel M.....'99	5 00	
Rapelye, Charles A .....'98	5 00	
Rauch, Henry .....'99	5 00	
Rauschkolb, John .....'98	5 00	
Ray, Peter W .....'98-'99	10 00	
Redsecker, Jacob H.....'98	5 00	
Reed, Thomas D.....'97	5 00	
Reed, Willoughby H.....'98-'99	10 00	
Reidy, Michael.....'98	5 00	
Reynolds, Charles E.....'98-'99	10 00	
Reynolds, John J.....'98	5 00	
Rhode, Rudolph E .....'99	5 00	
Rhodes, Charles O .....'99	5 00	
Richardson, Horatio S.. ....'99	5 00	
Richardson, Thomas L .....'98	5 00	
Riddell, Benjamin F.....'99	5 00	
Ridgway, Lemuel A .....'98-'99	10 00	
Roberts, William .....'99	5 00	
Robertson, Felix O.....'99	5 00	
Robertson, Peter.....'97-98	10 00	
Robins, Wilbur F .....'98	5 00	
Robinson, Edward A .....'99	5 00	
Robinson, Ernest F .....'98	5 00	
Robinson, Samuel L.....'98	5 00	
Robinson, William A.....'98	5 00	
Rockefeller, Lucius.....'99	5 00	
Rogers, Arthur H.....'98	5 00	
Rogers, Henry H .....'98	5 00	
Rogers, William H .....'99	5 00	
Root, Wilfred F .....'98-'99	10 00	
Rosenthal, David A.....'98	5 00	
Rosenzweig, Benj..... .'98	5 00	
Rowlinski, Robert A .....'98	5 00	
Ruddiman, Edsel A .....'98	5 00	
Ruenzel, Henry G .....'99	5 00	
Ruete, Theodore W.....'97-'98	10 00	
Rumsey, Samuel L .....'98-'99	10 00	
Amount carried forward.....	$4005 00	$35 00

	Annual Dues.	Certificatee.
Amount brought forward	$4005 00	$35 00
Runyon, Edward W.....'98	5 00	
Rusby, Henry H..... .....'98	5 00	
Ryan, Frank G .....'99	5 00	
Sadtler, Samuel P .....'99	5 00	
Sauer, Louis W.....'96-'97-'98	15 00	
Sauerhering, Rudolph A.....'99	5 00	
Sawyer, Charles H.....'99	5 00	
Sawyer, William F.....'97-'98	10 00	
Sayre, Edward A.....'98	5 00	
Sayre, Lucius E.....'99	5 00	
Sayre, William H .....'98	5 00	
Schafer, George H .....'98	5 00	
Schafhirt, Adolph J.....'98	5 00	
Schellentrager, Ernst A ..'97-'98	10 00	
Scherer, Andrew .....'99	5 00	
Scherff, John P.....'99	5 00	
Scherling, Gustav .....'98	5 00	
Schetky, Laurence O.....'98	5 00	
Schieffelin, William J.....'99	5 00	
Schiemann, Edward B.....'98	5 00	
Schimpf, Henry W.....'98	5 00	
Schlaepfer, Henry J.....'99	5 00	
Schley, Steiner.....'98	5 00	
Schlotterbeck, Augustus G...'99	5 00	
Schmid, Henry.....'98	5 00	
Schmidt, Ferdinand T....'98-'99	10 00	
Schmidt, Florian C.....'99	5 00	
Schmidt, Frederick M .....'99	5 00	
Schmidt, Joseph H .....'98	5 00	
Schmidt, Valentine .....'98	5 00	
Schmitt, George J. F ....'99	5 00	
Schmitt, Joseph M .....'98	5 00	
Schmitter, Jonathan .....'98	5 00	
Schoettlin, Albert J.....'98	5 00	
Schrader, August .....'98	5 00	
Schrank, C. Henry.....'99	5 00	
Schueller, Ernst.....'99	5 00	
Schueller, Frederick W.....'99	5 00	
Schuh, Paul G .....'99	5 00	
Schurk, Louis.....'98	5 00	
Schweickhardt, Richard .....'96	5 00	
Scoville, Wilbur L .....'99	5 00	
Searby, William M.....'98	5 00	
Selzer, Eugene R.....'99	5 00	7 50
Sempill, Walter M .....'98	5 00	
Sennewald, Ferdinand W ....'98	5 00	
Serodino, Herman.....'99	5 00	
Seyin, N. Douglas .....'98	5 00	
Shafer, Erwin C.....'99	5 00	
Shannon, Thomas R.....'98	5 00	
Sharp, Harry.....'96-'97	10 00	
Sharples, Stephen P .....'99	5 00	
Shaw, Robert J .....'98	5 00	
Sheehey, Henry L .....'98	5 00	5 00
Sherman, Charles R.....'99	5 00	
Sherrard, Charles C.....'97-'98	10 00	
Sherwin, Eugene A .....'99	5 00	
Sherwood, Henry J .....'99	5 00	
Shimer, Miles H .....'99	5 00	
Shoemaker, Richard M.....'99	5 00	
Shryer, Thomas W.....'98-'99	10 00	
Shurtleff, Israel H .....'98	5 00	
Siegemund, Charles A..... '98	5 00	
Sieker, Ferdinand A .....'98-'99	10 00	
Simmons, Frank B .....'98	5 00	5 00
Simon, Wm. .....'99	5 00	
Simonson, William.....'97-'98	10 00	
Skelly, James J .....'99	5 00	
Skinner, William H.....'96-'97	10 00	
Slack, Henry R.....'98	5 00	
Slater, Frank H.....'98	5 00	
Smink, Robert W.....'97-'98	10 00	
Smith, B. Frank.....'98	5 00	
Smith, Charles B.....'98	5 00	
Smith, Clarence P.....'98	5 00	
Smith, Edward N .....'98	5 00	
Smith, Edward S.....'98	5 00	
Amount carried forward.....	$4450 00	$52 50

	Annual Dues.	Certificates.
Amount brought forward	$4450 00	$52 50
Smith, Lauriston S .....'99	5 00	
Smith, Linton.....'98	5 00	
Smith, Linville H .....'98	5 00	
Smith, Theodric.....'98	5 00	
Smith, Willard A.....'98	5 00	
Snow, Charles W.....'98	5 00	
Snyder, Robert J.....'98	5 00	
Sohrbeck, G. Henry.....'98-'99	10 00	
Sohrbeck, George W.....'98-'99	10 00	
Solomons, Isaiah A .....'99	5 00	
Sords, Thomas V .....'98-'99	10 00	
Spalding, Warren A.....'99	5 00	
Sparks, James M.....'98	5 00	
Spaulding, George S.....'98	5 00	
Sperry, Herman J.....'99	5 00	
Sprague. Wesson G.....'99	5 00	
Sprowl, George M.....'98	5 00	
Squibb, Edward H .....'99	5 00	
St. John, Sydney S.....'99	5 00	
Staebler, Richard.....'98	5 00	
Staehle, Louis L .....'98	5 00	
Stahlhuth, Ernst H. W...'98-'99	10 00	
Stamford, William H .....'98	5 00	
Stamm, Dante M.....'98	5 00	
Stange, Carl F .....'98	5 00	
Staudt, Louis C .....'98	5 00	
Stearns, Frederick .....'98-'99	10 00	
Steinhauer, Frederick.....'98	5 00	
Stevens, Alonzo B.....'98	5 00	
Stewart, Francis E.....'98-'99	10 00	
Stoehr, Julius J.....'96-'97-'98	15 00	
Stoughton, Dwight G.....'98	5 00	
Stowell, Daniel.....'98	5 00	
Streett, Edmund O.....'98	5 00	
Stuart, William A ....'98	5 00	
Stuver, Emanuel .....'98	5 00	
Sweet, Caldwell .....'99	5 00	
Symonds, Arthur H.....'97-'98	10 00	
Takamine, Jokichi.....'98	5 00	
Taylor, George E.....'99	5 00	
Taylor, Mallory H.....'98-'99	10 00	
Taylor, Walter T.....'97-'98-'99	15 00	
Thames, Joseph J .....'98	5 00	
Thieman, John H. Jr.....'98	5 00	
Thomas, John B.....'98	5 00	
Thomas, Robert J.....'98-'99	10 00	
Thomasson, Anders.....'99	5 00	
Thompson, Albert E.....'98	5 00	
Thompson, William S .....'98	5 00	
Thorn, Henry P.....'99	5 00	
Thurston, Azor .....'98	5 00	
Tigner, James O .....'98	5 00	
Tilden, Amos K.....'98	5 00	
Tobin, John M .....'97-'98	10 00	
Todd, Albert M.....'98-'99	10 00	
Topley, James .....'99	5 00	
Torbert, Willard H.....'99	5 00	
Tracy, David W .....'98	5 00	
Treat, Joseph A.....'99	5 00	
Treherne, John C.....'98	5 00	
Troxler, Constantine, Jr.....'98	5 00	
Truax, Charles .....'98-'99	10 00	
Turner, George H .....'97	5 00	
Turrell, Judson W .....'98	5 00	
Urban. Jacob P .....'98-'99	10 00	
Van Antwerp, Andrew ...'97-'98	10 00	
Van Antwerp, Garet .....'97-'98	10 00	
Van Auken, Jerrie A.....'96-'97	10 00	
Van Winkle, Abraham W.....'98	5 00	
Vargas-Heredia, Jorge .....'98	5 00	
Varney, Edward F .....'98	5 00	
Vaughan, Parry W .....'97	5 00	
Vellines, Davies .....'96-'97	10 00	
Viallon, Paul L .....'96	5 00	
Vitt, Rudolph S..... ..'98	5 00	
Vockroth, Emil .....'98	5 00	
Voight, Joseph F. .....'99	5 00	
Vonachen, Frank H.....'98	5 00	
Amount carried forward	$4945 00	$52 50

	Annual Dues.	Certificates.
Amount brought forward	$4945 00	$52 50
Vordick, August H.....'98	5 00	
Voss, George W..... .....'99	5 00	
Votteler, William.....'98	5 00	
Walker, David.....'98	5 00	
Walker, John P.....'99	5 00	
Walker, William J .....'99	5 00	
Wall, Otto A.....'98	5 00	
Walts, Charles C.....'98	5 00	
Walts, David Y .....'98	5 00	
Wangler, Conrad D.....'98-'99	10 00	
Wanous, Josie .....'98-'99	10 00	
Ward, A. Jae .....'98	5 00	
Ware, Charles H.....'98	5 00	
Warn, William E.....'99	5 00	
Washburn, Harry M .....'97	5 00	
Watson, Herbert K.....'98	5 00	
Watson, Sydney P.....'98	5 00	
Watt, George H.....'98	5 00	
Watters, Henry .....'98	5 00	
Wearn, William H ...'96-'97-'98	15 00	
Webb, William H .....'99	5 00	
Webber, J. Le Roy.....'98-'99	10 00	
Webster, H. Gordon. .....'98	5 00	
Weeks, B. Frank.....'96	5 00	
Weida, Charles A ....'98	5 00	
Weidemann, Charles A .....'99	5 00	
Weiser, William A .....'96	5 00	
Wells, Edwin H .....'98	5 00	
Wenzell, William T .....'99	5 00	
Wescott, William C..... ....'98	5 00	
West, Charles A.....'99	5 00	
Wetterstroem, Albert.....'98	5 00	
Wetterstroem, Theodore D...'98	5 00	
Whelpley, Henry M.....'98	5 00	
Whitcomb, Frederick E.....'98	5 00	
White, George H.....'96	5 00	
White, Herbert F .....'98	5 00	
White, Richard E .....'98	5 00	
Whitman, Nelson S.....'98	5 00	
Whitney, Edgar F.... .....'99	5 00	
Wichelns, Frederick.....'99	5 00	
Wickham, William H..... .....'99	5 00	
Weisel, John M.....'98	5 00	
Wikle, Jesse L..... ...'98	5 00	
Wilbur, Lot.....'99	5 00	
Wilhite, Frank T ....'97-'98-'99	15 00	
Williams, Charles F.. ...'96-'97	10 00	
Williams, George G .....'98	5 00	
Williams, John K .....'98	5 00	
Williams, Richard W.....'99	5 00	
Williams, Seward W.....'98	5 00	
Williams, William H.....'98-'99	10 00	
Williamson, Lee.....'98	5 00	
Willis, Henry ....'98	5 00	
Wilson, Charles F ..... .'96-'97	10 00	
Wilson, Frank M.....'99	5 00	
Wilson, John M.....'98	5 00	5 00
Winkelmann, Harry C .....'98	5 00	
Wittich, Matthew H.....'98	5 00	
Wittmer, Joseph W. Jr .....'99	5 00	
Wood, Alonzo F. Jr .....'99	5 00	
Wood, Edward S.....'99	5 00	
Wood, James P ....'99	5 00	
Wood, John W .....'98-'99	10 00	
Woodman, Walter I .....'99	5 00	
Woods, Chas. H. A .....'98	5 00	
Woolbridge, Daniel T .....'99	5 00	
Wuensch, Charles.....'98	5 00	
Wulling, Frederick J .....'98	5 00	
Wunderlich, Edward .....'98	5 00	
Wurmb, Theodore H.'96-'97-'98	15 00	
Yearby, William M.....'97-'98	10 00	
Youngs, William .....'97-'98	10 00	
Zimmer, Harry E.....'96	5 00	
Zimmermann, Albert .....'99	5 00	
Zimmermann, Charles .....'98	5 00	
Zoeller, Edward V.....'99	5 00	
Zuenkeler, J. Ferd.....'99	5 00	
Totals.....	$5410 00	$57 50

APPENDIX.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-SEVENTH ANNUAL MEETING, HELD AT PUT-IN-BAY, OHIO, WITH THE NAMES OF THEIR PRESIDENTS AND SECRETARIES.

Name.	*President.*	*Secretary.*
Albany	Wm. J. Walker	De Baum Van Aken.
Atlanta	N. J. Hammond	W. S. Kendrick.
Chicago	A. S. Draper	Wm. B. Day.
Cleveland	E. A. Schellentrager	Joseph Feil.
Louisville	Simon N. Jones	Gordon L. Curry.
Maryland	Chas. E. Dohme	Henry P. Hynson.
Massachusetts	Wm. H. Puffer	Wm. D. Wheeler.
Montreal	Wm. H. Chapman	E. Muir.
National	H. C. Easterday	W. H. Bradbury.
New York	Edward Kemp	Thos. F. Main.
Ontario	W. A. Karn	Isaac F. Lewis.
Philadelphia	Chas. Bullock	W. Nelson Stem.
St. Louis	H. F. A. Spilker	J. C. Falk.

SCHOOLS OF PHARMACY.

Northwestern University	Oscar Oldberg, *Dean.*
University of Minnesota	F. J. Wulling, *Secretary.*

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

Name.	*President.*	*Secretary.*
Cleveland	E. R. Selzer	M. Louise Carroll.
Maryland	A. P. Sharp	A. Ferd. Ries.
Philadelphia	F. W. E. Stedem	Wm. E. Krewson.
St. Louis	Otto F. Claus	C. G. Hinrichs.

STATE PHARMACEUTICAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Alabama	P. C. Candidus	L. S. Brigham.
California	Gaston E. Bacon	Jno. Calvert.
Connecticut	Chas. F. Williams	Chas. A. Rapelye.
Illinois	Fred. M. Schmidt	R. N. Dodds.
Indiana	F. D. Warner	A. Timberlake.
Iowa	W. G. Bale	Fletcher Howard.
Kansas	R. F. Bryant	F. A. Snow.
Kentucky	Jno. J. Raynolds	J. W. Gayle.
Maine	A. M. Robinson	M. L. Porter.
Maryland	A. R. L. Dohme	Chas. H. Ware.

Name.	*President.*	*Secretary.*
Massachusetts	Wm. D. Wheeler	J. F. Guerin.
Michigan	Jno. J. Sourwine	Chas. F. Mann.
Minnesota	John Nielson	E. B. Wilson.
Missouri	H. M. Pettit	H. M. Whelpley.
Nebraska	H. A. Small	L. M. Welch.
New Jersey	Wm. C. Alpers	F. C. Stutzlen.
North Carolina	J. B. Smith	P. W. Vaughan.
Ohio	Alfred DeLang	Lewis C. Hopp.
Pennsylvania	C. N. Boyd	J. A. Miller.
Province of Quebec	Alexis Robert	E. Muir.
Rhode Island	M. B. Wood	C. H. Daggett.
Tennessee	B. H. Owen	W. Vickers.
Texas	Ed. Dreiss	R. H. Walker.
Virginia	A. W. Eley	C. B. Fleet.
Vermont	W. E. Terrill	W. F. Root.
Wisconsin	Chas. A. Spencer	H. Rollmann.

NATIONAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Proprietary	V. Mott Pierce	Jos. Leeming.
Retail Druggists	H. P. Hynson	Thos. V. Wooten.
Wholesale Druggists	C. P. Walbridge	A. B. Merriam.

LOCAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Cleveland Pharm. Assoc.	E. R. Selzer	M. Louise Carroll.
German Apothec. Soc., of City of N. Y.	Chas. F. Schleussner	Sidney Faber.
Kings County Pharm. Assoc.	A. Paradis	F. P. Tuthill.
Manhattan Pharm. Assoc.	Reuben R. Smith	Thos. J. Keenan.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT PUT-IN-BAY.

Names of delegates indicated by *; delegates not members, by *†.

*†Albrecht, Joseph, Cleveland, O.
Alpers, Wm. C., New York, N. Y.
Averill, Wm. H., Frankfort, Ky.
*Bartley, E. H., Brooklyn, N. Y.
*Base, Daniel, Baltimore, Md.
Beal, James H., Scio, O.
Benfield, C. W., Cleveland, O.
*Bingham, W. E., Tuscaloosa, Ala.
Burkhardt, M. A., Dayton, O.
Byrne, John, Columbus, O.
Cameron, Donald L., Rutherford, N. J.
*†Carroll, M. Louise, Cleveland, O.
*Carter, Frank H., Indianapolis, Ind.
Caspari, Chas. Jr., Baltimore, Md.
Cassady, O. U., Youngstown, O.
*†Cheney, F. J., Toledo, O.
Diekman, Geo. C., New York, N. Y.
*Diehl, C. Lewis, Louisville, Ky.
Dewoody, Wm. L., Pine Bluff, Ark.
Dohme, Chas. E., Baltimore, Md.
Drury, Linus D., Boston, Mass.
*Eberbach, Ottmar, Ann Arbor, Mich.
*Ebert, Albert E., Chicago, Ill.
*Eccles, Robert G., Brooklyn, N. Y.
*Eliel, Leo, South Bend, Ind.
*Elliott, Henry A., Baltimore, Md.
*Etzel, John, Clear Lake, Ia.
Feil, Joseph, Cleveland, O.
Fennel, Chas. T. P., Cincinnati, O.
Firmin, Jno. C., Findlay, O.
*Forston, Keene R., San Antonio, Tex.
*Foster, J. Webb, Baltimore, Md.
Godbold, F. C., New Orleans, O.
Gordin, H. M., Ann Arbor, Mich.
*Good, James M., St. Louis, Mo.
*†Graham, W. B., Ridgetown, Can.
Haake, Wm. H., Cleveland, O.
*Hallberg, C. S. N., Chicago, Ill.
Hannan, O. B., Cleveland, O.
Hartnett, Eugene, Jersey City, N. J.
Hauenstein, Wm., New York, N. Y.
*Hechler, Geo. L., Cleveland, O.
Helfman, Joseph, Detroit, Mich.
*Hereth, F. S., Chicago, Ill.
Holzhauer, Charles, Newark, N. J.
Hopp, Lewis, C., Cleveland, O.
Houghton, E. M., Detroit, Mich.
*Howard, Fletcher, Des Moines, Ia.
Hurty, Jno. N., Indianapolis, Ind.
Huston, Chas., Columbus, O.
*Hynson, Henry P., Baltimore, Md.
Jackman, Wm. F., Orono, Me.
Jones, Simon N., Louisville, Ky.
Jungmann, J., New York, N. Y.
*Kauffman, Geo. B., Columbus, O.
*Kennedy, Geo. W., Pottsville, Pa.
Klein, E. F., Hot Springs, Ark.
*Klor, A. E. G., Newport News, Va.
Knoefel, Chas. D., New Albany, Ind.
Koch, Julius A., Pittsburg, Pa.
Knox, J. W. T., Detroit, Mich.
*Kraemer, Henry, Philadelphia, Pa.
Kremers, Edw., Madison, Wis.
Krueger, Owen A., Kansas City, Mo.
Kuder, Wm. F., Cleveland, O.
Lehr, John, Cleveland, O.
Lloyd, John U., Cincinnati, O.
Lowe, C. B., Philadelphia, Pa.
*Lyons, A. B., Detroit, Mich.
*Main, Thos. F., New York, N. Y.
Mason, Harry B., Detroit, Mich.
*Mayo, Caswell A., New York, N. Y.
Menk, Chas. W., Newark, N. J.
Mennen, Gerhard, Newark, N. J.
Merrell, Chas. G., Cincinnati, O.
Miller, T. Ashby, Richmond, Va.
Miller, Wm. H., New Philadelphia, O.
Muench, Wm., Syracuse, N. Y.
Myers, P. B., Omaha, Neb.
*Newman, Geo. A., Louisville, Ky.
Noll, Martin J., St. Louis, Mo.
Ogier, J. M., Cambridge, O.

*Oldberg, O., Chicago, Ill.
*Parisen, Geo. W., Perth Amboy, N. J.
Parsons, Chas. W., New York, N. Y.
*Patton, John F., York, Pa.
*Payne, Geo. F., Atlanta, Ga.
Perry, F. W. R., Detroit, Mich.
Phillips, E. F., Armada, Mich.
Pieck, E. L., Covington, Ky.
*†Pierce, F. W., Chester, Vt.
*Powell, Wm. C., Snow Hill, Md.
*Prescott, A. B., Ann Arbor, Mich.
*Quandt, Arthur A., Baltimore, Md.
*Ramsperger, Gust., New York, N. Y.
*Rapelye, Chas. A., Hartford, Conn.
Rauschkolb, John, Columbus, O.
*Reed, Thos. D., Montreal, Can.
Reidy, M., Corunna, Mich.
Remington, Joseph P., Philadelphia, Pa.
*Ruddiman, E. A., Nashville, Tenn.
Rusby, Henry H., New York, N. Y.
*Ryan, Frank G., Philadelphia, Pa.
*Sander, Enno, St. Louis, Mo.
*Sayre, E. A., New York, N. Y.
Schellentrager, Ernst, Cleveland, O.
Schlotterbeck, J. O., Ann Arbor, Mich.
Schmidt, O. W., Chicago, Ill.
*Schneider, Albert, Chicago, Ill.
*Schuh, Paul G., Cairo, Ill.
Seabury, Geo. J., New York, N. Y.
*Selzer, Eug. R., Cleveland, O.
Sheehey, H. L., Sherman, Tex.
*Sheppard, S. A. D., Boston, Mass.
Sherwood, H. J., Cleveland, O.
*Sloan, Geo. W., Indianapolis, Ind.
Sprague, W. G., Flushing, Mich.
Staehle, L. R., Newark, N. J.
*Stecher, F. W., Cleveland, O.
*Stedem, F. W. E., Philadelphia, Pa.
*Steiner, S. G., Nashville, Tenn.
*Stevens, A. B., Ann Arbor, Mich.
Stewart, F. E., New York, N. Y.
*Terrill, W. E., Montpelier, Vt.
*Thompson, Wm. S., Washington, D. C.
*Tuthill, Fred. P., Brooklyn, N. Y.
Voss, Geo. W., Cleveland, O.
*Wangler, C. D., Waterloo, Ia.
Wanous, Josie A., Minneapolis, Minn.
Watson, H. K., Wilmington, Del.
*Watters, Henry, Ottawa, Can.
*Westervelt, F. E., Grand Rapids, Mich.
*Whelpley, H. M., St. Louis, Mo.
Whitney, H. M., North Andover, Mass.
*Wikle, Jesse L., Anniston, Ala.
Williams, S. W., East Orange, N. J.
*Willis, Henry, Quebec, Can.
Wood, Mason B., E. Providence, R. I.

LIST OF NEW MEMBERS.

Alexander, Chas. E., York, Pa.
Appleby, Samuel N., Baltimore, Md.
Barnett, Joel J., Montgomery, Ala.
Baughman, Jno. H., Baltimore, Md.
Beck, Jno. G., Baltimore, Md.
Bell, Emil R., Louisville, Ky.
Blakely, Collins, Montpelier, Vt.
Bueger, Alvin, E. Liverpool, O.
Burwell, Arthur C., Boston, Mass.
Cardwell, James R., Cleveland, O.
Cassaday, O. U., Youngstown, O.
DeJonge, Cornelius, Brooklyn, N. Y.
Dohme, C. Louis, Baltimore, Md.
Elliott, Chas. H., Washington, D. C.
Englander, Saml., Brooklyn, N. Y.
Forston, Keene R., San Antonio, Tex.
Gordin, Harry M., Ann Arbor, Mich.
Greene, Lester H., Montpelier, Vt.
Houghton, E. Mark, Detroit, Mich.
Hudnut, Richard A., New York City, N. Y.
Jackman, Wilbur F., Orono, Me.
Johnson, Joseph H., Arcanum, O.
Jorgenson, Hans C., Portsmouth, N. H.
Kaemmerer, Wm. F., Columbus, O.
Keaney, James J., Malden, Mass.
Klor, Alex. E. G., Newport News, Va.
Kornmann, Henry, Baltimore, Md.
Lincoln, George W., Philadelphia. Pa.
Lyon, George C., Providence, R. I.
Massie, Paul, Roanoke, Va.
McConnell, Chas. H., Chicago, Ill.
Mead, Nehemiah P., Akron, Va.
Millard, David R., Baltimore, Md.
Miller, Chas. E., Washington, D. C.
Morgan, Charles, Baltimore, Md.
Muench, Wm., Syracuse, N. Y.
Neal, Chas. C., Danville, Va.
Paine, Chas. J., Waycross, Ga.
Parsons, Chas. W., New York City.
Pfaff, Franz, Boston, Mass.
Price, Roger T., Norfolk, Va.
Sanborn, George C., Northfield, Vt.
Schmidt, Oscar W., Chicago, Ill.
Schneider, Albert, Chicago, Ill.
Scott, Theodore W., League Island, Pa.
Seltzer, Leonard A., Detroit, Mich.
Slade, Harry A., Montpelier, Vt.
Steiner, Samuel G., Nashville, Tenn.
* Street, Edmund O., Baltimore, Md.
Terrill, Willis E., Montpelier, Vt.
Topping, Chas. O., Brooklyn, N. Y.
Trefethen, Frederick J., Kittery, Me.
Tuthill, Frederic P., Brooklyn, N. Y.
Waddell, Minor T., Indianapolis, Ind.
Waggener, Richard, Pensacola, Fla.
Walter, Chas. A., Indianapolis, Ind.
Zwick, Karl G., Covington, Ky.

* Elected in 1898, but name received too late for publication in last volume of Proceedings.

LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics;* under the present By-Laws, in SMALL CAPITALS.]

Abernethy, Maxwell.
BAUER, LOUIS G.
Best, John.
BIROTH, HENRY.
Blatchford, Eben.
BORING, EDWIN M.
BUCK, JOHN.
Bullock, Charles.
CANDIDUS, PHILIP C.
CANNING, HENRY.
Colton, James B.
COOMBS, CHARLES E.
Crossman, George A.
Cummings, Henry T.
Dearborn, George L.
DOHME, LOUIS.
Doliber, Thomas.
DRAKE, JOHN R.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Eckford, Joseph W.
ELLIOTT, HENRY A.
Ellis, Evan T.
FOUGERA, EDMUND C. H.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel F.
GROSSKLAUS, JOHN F.
HANCE, EDWARD H.
HARLOW, NOAH S.
Haviland, Henry.
Heintzelman, Joseph A.
Heyl, James B.
HOLMES, CLAY W.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. F.
Jesson, Jacob.
Kent, Robert R.
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
LEE, JAMES A.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
LEWELLYN, JOHN F.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
MEYER, CHRISTIAN F. G.
MILHAU, EDWARD L.
MILLER, ADOLPHUS W.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
MOORE, GEORGE.
MOORE, JOACHIM B.
Ollif, James H.
ORNE, JOEL S.
OWENS, RICHARD J.
Patten, I. Bartlett.
Peabody, Wm. H.
Perot, T. Morris.
PETITT, HENRY M.
PFINGST, FERDINAND J.
POWER, FREDERICK B.
Rano, Charles O.
RAMSPERGER, GUSTAVUS.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.
ROBINSON, JAMES S.

Rollins, John F.
Sander, Enno.
Saunders, William.
Seabury, George J.
Sharp, Alpheus P.
Sheppard, Samuel A. D.
Shinn, James T.
Simms, Giles G. C.
Sloan, George W.
Snyder, Ambrose G.
Squibb, Edward R.
Stacey, Benjamin F.
Steele, James G.
Sweeney, Robert O.
Thompson, William B.
Vernor, James.
Viallon, Paul L.
Wardell, Robert C.
Warner, William R.
Waugh, George J.
Wellcome, Henry S.
Whitfield, Thomas.
Whitney, Henry M.
Wiegand, Thomas S.
Wilson, Benjamin O.
Winkelmann, John H.
Winter, Jonas.
Woltersdorf, Louis.
Yorkston, Matthew M.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

Sections Applicable to the American Pharmaceutical Association.

Class 3, Societies, Benevolent, Educational, etc.

Sec. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and object of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

Sec. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

Sec. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

Sec. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

Sec. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said Association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth. The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed: JOHN U. LLOYD, MAURICE W. ALEXANDER, ALEX. K. FINLAY, KARL SIMMON, SAMUEL A. D. SHEPPARD, JOHN M. MAISCH, JAMES VERNOR, C. LEWIS DIEHL, WILLIAM H. ROGERS, WM. SAUNDERS, ALBERT E. EBERT, PHILIP C. CANDIDUS, GEORGE W. KENNEDY, ALBERT H. HOLLISTER, JAMES M. GOOD, LEWIS C. HOPP, WILLIAM DUPONT,

Members of the Council,

And JOHN A. MILBURN, G. G. C. SIMMS, E. B. BURY, Z. W. CROMWELL, W. S. THOMPSON, JOHN R. MAJOR, CHARLES CHRISTIANI, W. G. DUCKETT, A. J. SCHAFHIRT, GEO. W. BOYD, O. H. COUMBE, HENRY A. JOHNSTON, GEO. B. LOCKHART, W. C. MILBURN, T. C. MURRAY, ARTHUR NATTANS, JOSEPH R. WALTON, THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAMES M. TROTTER, *Recorder.*

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the General Secretary.

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary of $1000, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1. An introduction or synopsis of the Report to be presented to the Section on Scientific Papers.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of twenty-one members, nine of whom, selected from such members as have had at least three years' membership in this Asso-

ciation, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but *ex-officio* members of the Council shall be eligible for re-election thereto until one year after the expiration of their term of office.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

CHAPTER VII

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing, to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, elect such person a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual dues for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, also any member who shall have paid to the Treasurer annual dues for thirty-seven years, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER VIII.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Section on Scientific Papers: 2. Section on Commercial Interests; 3. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth, fifth and sixth sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the seventh, eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 7. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 8. A committee of five on time and place of meeting shall be appointed by the President at the first session, to report at the second session.

Section 9. Incidental business.

ARTICLE XII. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the persons nominated shall be balloted for.

Section 4. The Council shall present names of persons recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

Section 7. Incidental business.

ARTICLE XIII. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVI. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER IX.

Of Committees.

ARTICLE I. There shall be appointed or elected seven Standing Committees as follows: a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, and a Committee on Pharmaceutical Legislation and Education, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, each to consist of three members; and a Committee on Transportation, to consist of ten members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person preparing a paper for the Association which will require more than ten minutes for its reading, must accompany the same with a synopsis which can be read within ten minutes' time. The paper and synopsis must both be furnished the Committee of the particular Section to which it refers, previous to the first session.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall, at the next annual meeting after the one at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practic-,

and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE IX. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

CHAPTER X.

Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $150.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

CHAPTER IV.

Of Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of seven members of the Council, to be elected annually by ballot. The General Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of seven members of the Council, the General Secretary and the Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

SECTION ON COMMERCIAL INTERESTS.

ORDER OF BUSINESS.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Reading of Papers.
5. New Business and Discussion.
6. Nomination and Election of Officers for the ensuing year.
7. Installation of Officers.
8. Reading of the Minutes.
9. Adjournment.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.
4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.
5. Reading of Papers and discussions on the subjects brought up.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

SECTION ON EDUCATION AND LEGISLATION.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.
2. Reading of the Address of the Chairman.
3. Reports of Committees.
4. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
5. Reading of Papers and Discussion.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed by the Council an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, saving-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full.....

Number and Street.....

Town and State.....

Recommended by the undersigned two members in good standing:

.....

.....

FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VII., ARTICLE II., OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VII., Article II. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES. ADDRESS.

Proposed by.....

.....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full.....

Date.....

Address.....

.....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc. Pottsville, Penn.

ROLL OF MEMBERS

HONORARY MEMBERS

FOREIGN COUNTRIES.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Michael Carteighe, F. I. C., *London*, 1882.
Joseph Ince, F. L. S., *London*, 1882.
Richard Reynolds, F. C. S., *Leeds*, 1882.
Wm. Martindale, F. L. S., F. C. S., *London*, 1898.
E. M. Holmes, F. L. S., *London*, 1899.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.

GERMANY.

Dr. Edward Schaer, *Strassburg*, 1877.
Dr. Frederick Hoffmann, *Berlin*, 1898.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Ernst Schmidt, Geh. Reg. Rath., *Marburg*, 1899.

INDIA.

David Hooper, F. I. C., F. C. S., *Calcutta*, 1899.

RUSSIA.

Johannes von Martenson, Staatsrath, *St. Petersburg*, 1882.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Anniston.

Wikle, Jesse Lane 1898

Auburn.

Miller, Emerson Romeo 1895

Mobile.

Brown, Albert Edward 1887
CANDIDUS, PHILIP CHARLES 1857
La Grange, John Van Nuys 1897
Punch, William Francis 1874
Van Antwerp, Andrew 1890
Van Antwerp, Garet 1880

Montgomery.

Andrew, Edgar Cecil 1895
Barnett, Joel Jones 1899
Brigham, Laurence Stanton 1898
Knabe, Gustavus Alexander 1876

Selma.

Galt, Edward Pegram 1883

Tuscaloosa.

Bingham, William Ellison 1898

ARIZONA.

Phœnix, Maricopa Co.

Eschman, Clemens Louis 1889
Furl, Irwin William 1894
Hudson, Taliaferro Flournoy 1894

Prescott.

Brisley, Harry 1894

ARKANSAS.

Batesville.

Fletcher, John Wade 1894
Kerr, William Whitman 1887

Camden.

Morgan, Aylmer Lee 1890

Diamond P. O.

Laird, John 1895

Fort Smith.

Morton, John Walker 1894
Sparks, James Mitchell 1894

Helena.

King, Robert Bruce 1896

Hot Springs.

Klein, Ernest Frederick 1894

Little Rock.

Bond, John Barnitz 1883
Jungkind, John August 1887

Pine Bluff.

Dewoody, William Lawrence 1887

Pocahontas.

Skinner, William Henry 1894

Searcy.

Robertson, Felix Otey 1890

CALIFORNIA.

Benicia Barracks.

Miller, Herman 1897

Centreville, Alameda Co.

Lernhart, August 1889

Los Angeles.

Kirkland, Derwentwater 1889

Mare Island.

Pearman, William Edgar 1898

Napa.

Levinson, Joseph 1895

Ontario.

Jesson, Jacob 1872

Oroville, Butte Co.

Ekman, Nils Adolf 1889

Pasadena.

Bley, Alphonso Albert Willets 1889

San Francisco.

Argenti, Jerome John Baptiste 1893
Bayly, Charles Alfred 1889
Dawson, John Henry 1882
Esters von Krakau, James Henry William 1897
Joy, Edwin Wolcott 1882
Moffit, Thomas Sebatier 1861
Pearson, Joseph Frederick 1897
Schmidt, Valentine 1887
Searby, William Martin 1882
Stange, Carl Frederick 1897
STEELE, JAMES GURDEN 1859
Weihe, Otto Albert 1893
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Clara.

Oberdeener, Samuel 1889

Santa Monica.

Devine, John 1887

Vallejo, Solano Co.

Topley, James 1869

COLORADO.

Boulder.

Ramaley, Francis 1897

Central City.

Best, John 1866
Davies, Llewellyn Powell 1891

Colorado Springs.

Ward, Augustus Jae 1893

Cripple Creek.

Beitenman, William Wallace 1888

Denver.

Davison, James 1895
Depeyre, Louis Nolël 1894
Ford, Charles Mangan 1887
Hover, William Adgate 1895
Lord, Frank Jotham 1889
Scholtz, Edmund Louis 1881
Steinhauer, Frederick 1881
Walbrach, Arthur 1881

Leadville.

Taylor, George Edward 1895

Longmont.

Turrell, Judson Wade 1893

Manzanola.

Clowes, William Legh 1895

Pueblo.

Cambier, Jacob 1895
Wells, Charles Horton 1893

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington 1883
Bradbury, Wymond Henry 1895
Criswell, Francis McClure 1892
Duckett, Walter G. 1876
Easterday, Herbert Clifton 1893
Elliott, Charles Houston 1899
Eppley, James Kerr 1895
Ewell, Ervin Edgar 1898
Field, William Carlin 1898
Flemer, Lewis 1895
Hammar, Alrik 1897
Henry, Charles Landon 1893
Henry, Frank Clinton 1894
Herbst, William Parker 1895
Hilton, Samuel Louis 1890
Hurlebaus, George William 1895
Hutton, Harry Dubant 1891
Johnston, Henry Augustus 1883
Kelley, Charles Maurice 1897
Major, John Richards 1873
Martin, John Charles 1883
May, Edward 1897
Miller, Charles Elliott 1899
Mulcahy, Daniel Domnick 1895
Schafhirt, Adolph Julian 1876
SIMMS, GILES GREEN CRAYCROFT 1860
Thompson, William Scott 1871

CONNECTICUT.

Bridgeport.

Fisher, Elbert Ellsworth 1892

Hartford.

Chapin, Frederick Hastings 1880
Cone, John Wright 1876
Edwards, Frederick Bulkeley.....1894
Newton, Philo Woodhouse.....1892
Rapeyle, Charles Andrew 1876
Shannon, Thomas Ross Alvin 1892
Stoughton, Dwight George..... ...1890
Tracy, David Wallace 1892
Williams, John Kirby 1875

Jewett City.

Chabot, David Pierre.....1895

Meriden.

Mosher, William Wooster.....1894

Middletown.

Pitt, John Richard.....1872

Naugatuck.

May, James Oscar 1875

New Britain.

Perkins, Charles William 1892

New Haven.

Dimock, Robert Hemphill 1889
Eagny, James Thomas..... 1894
Gessner. Emil Adolph 1878
Hogan, John Joseph 1890
Lowe, John William 1898
Mix, Willis Lee 1896
Spalding, Warren Alphonso.....1876
Sperry, Herman Jay 1880
Wood, Alonzo Felton, Jr.....1890
Wood, James Prior 1890

New London.

Cowan, John.....1897
Nicholas, John Cutter 1886

Norwich.

Duggan, James.....1894
Sevin, Nathan Douglas.....1875

Putnam.

Dresser, George Edward.....1886

Thomaston.

Williams, Charles Fish..... 1888

Thompsonville, Hartford Co.

Smith, Edward Newton 1885
Steele, George Robert.....1892

Waterbury.

Woodruff, Roderick Samuel.....1876

Willimantic.

Wilson, Frank Milton... 1883

DELAWARE.

Wilmington.

Belt, Zedekiah James 1876
Collins, Edward Smith.....1897
Watson, Herbert Kennedy.....1888

FLORIDA.

De Land.

Fisher, George Washington 1893

Fort George.

Rollins, John Francis 1859

Jacksonville.

Crum, John Darius 1892
Kirk, James Edgar.....1896

St. Augustine.

Smith, Lauriston Stephen.....1892
Woodman, Walter Irving 1893

Titusville, Brevard Co.

Dixon, John Marion 1894

Warrington.

Waggener, Richard.....1899

GEORGIA.

Atlanta.

Avary, Moody Burt 1892
Cronheim, Solomon.....1892
Dunwoody, Richard Gaillard 1891
Jacobs, Joseph 1894
Payne, George Frederick 1893
Sharp, Harry 1890
Watson, Sidney Powell 1887

Augusta.

Durban, Sebastian Charles 1883
LAND, ROBERT HENRY 1859

Bowdon.

Lovvorn, James Lewis.....1897

Brunswick.

Joerger, Frederick 1896

Greenville.

Tigner, James Ogletree.....1890

La Grange.

Slack, Henry Richmond 1890

Macon.

Brunner, Norman Isaac 1878
Cheatham, Thomas Alexander 1890
King, Campbell Thomas 1897
Lamar, Henry James 1897
Morris, Max 1898
Taylor, Mallory Hunt 1898

Rome.

Curry, David W 1894
Trevitt, Cleophas Aristobolus 1896

Savannah.

Rowlinski, Robert Antone 1892
Solomons, Isaiah Abram 1894

Summerville.

Arrington, Homer Houston 1892

Thomasville.

Thomas, Robert, Jr. 1888

Waycross.

Paine, Charles Joshua 1899

IDAHO.

Emmett.

Smithson, David Elmer 1890

ILLINOIS.

Aurora.

Staudt, Louis Carl 1890

Cairo.

Schuh, Paul Gustav 1894
Woods, Charles Henry Albert 1897

Camp Point, Adams Co.

Bartells, George Case 1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888

Chicago.

Bartlett, Nicholas Gray 1864
Behrens, Emil Christian Louis 1893
Behrens, Paul Johannes Heinrich 1888
Birotii, Henry 1865
Bishop, Samuel Edward 1890
Button, Charles Edwin 1881
Conrad, John 1887
Davoll, David Lake, Jr 1897
Day, William Baker 1895
Ebert, Albert Ethelbert 1864
Fischer, Oscar Frederick 1892
Frerkson, Richard Christopher 1888
Fuller, Oliver Franklin 1869
Gale, Edwin Oscar 1857
Gale, William Henry 1857
Grassly, Charles William 1884
Gray, William 1892
Hallberg, Carl Swante Nicanor 1879
Hartwig, Otto Julius 1892
Hereth, Franklin Samuel 1893
Klein, Frederick 1893
Lehman, Louis 1895
Lord, Thomas 1882
Lundberg, John Christian 1892
Matthews, Charles Edwards 1893
McConnell, Charles Henry 1899
McMonies, Thomas Little 1897
Miner, Maurice Ashbel 1880
O'Gorman, Theophilus Vincent 1897
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Theodore Henry 1869
Pattison, George Henry 1893
Porter, Millett Nathan 1892
Puckner, William August 1888
Rhode, Rudolph Ernst 1887
Sargent, Ezekiel Herbert 1864
Scherer, Andrew 1884
Schmidt, Florian Charles 1882
Schmidt, Frederick Michael 1887
Schmidt, Oscar Weber 1899
Schneider, Albert 1899
Sempill, Walter Morrison 1892
Truax, Charles 1882
Whitfield, Thomas 1865
Woltersdorf, Louis 1865
Wooten, Thomas Victor 1893

East St. Louis.

Knoebel, Thomas 1892

Geneseo.

Stamm, Dante Milton 1896

Highland.

Mueller, Adolphus 1871

Kankakee.

Rogers, Henry Horace 1895

Moline.

Lindvall, Charles Gustaf 1897

Sohrbeck, George Henry.....1888
Sohrbeck, George William 1897

Mt. Vernon.

Morse, Edward Worth.....1896

North Alton.

Barth, George Fred.....1896

Ottawa.

Higby, William Herbert.....1892

Pekin.

Ehrlicher, Henry Michael.....1892

Peoria.

Benton, Wilber Merritt.....1888
Heschong, John Frederick.....1896
Lueder, Fritz.....1894
Vonachen, Frank Herman 1895
Zimmermann, Albert 1893
Zimmermann, Charles 1881

Peru.

Adamick, Gustave Hattenhauer..... 1891

Pontiac.

Murphy, John Spence.....1896

Quincy.

Koch, John Adolph.....1896

Stronghurst, Henderson Co.

Harter, Isaac Foster.....1893

Vienna.

Simpson, William Calvert.....1895

INDIAN TERRITORY.

Eufaula.

Moore, Charles Gates 1892

Red Fork.

Clinton, Frederick Severs.....1897

Wynnewood.

Hillebert, George Allen.....1894

INDIANA.

Columbus.

Stahlhuth, Ernst Henry William.....1887

Evansville.

Rogers, Edward.....1897
Schlaepfer, Henry John 1879

Fairmount.

Beasley, William Alexander 1894

Garrett.

Stoehr, Julius John 1894

Indianapolis.

Carter, Frank Henry.....1891
Dill, Josiah Byron 1878
Eads, Robert Isom.....1895
Eichrodt, Charles William 1892
Field, Claud 1890
Frauer, Herman Emanuel.....1881
Huder, Henry J..... 1894
Hurty, John Newell.....1882
Lilly, Josiah Kirby.....1890
Pfafflin, Henry Adolph 1892
SLOAN, GEORGE WHITE.....1857
Waddell, Minor T 1899
Walter, Charles Albert.....1899

Jeffersonville.

Loomis, John Clarence 1876

La Porte.

Meissner, Frederick William, Jr. 1890

New Albany.

Knoefel, Bruno.....1896
Knoefel, Charles Deitrick.....1894

South Bend.

Eliel, Leo 1882
Meyer, Martin Monroe 1897

Terre Haute.

Baur, Jacob.....1879

Union City.

Sprowl, George Melburne. 1898

Warren.

Hickerson, William Henry.....1894

IOWA.

Akron.

Mead, Nehemiah Paul.... 1899

Charles City.

Legel, John Gotthelf 1897

Churdan.

Roberts, Thomas 1897

Clear Lake.

Etzel, John Leonhardt.....1897

Clinton.
Majer, Oscar.....1880

Davenport.
Ballard, John Winthrop 1871

Des Moines.
Howard, Fletcher.....1895
Macy, Sherman Riley 1891

Dubuque.
Torbert, Willard Horatio 1887
Wittmer, Joseph Washington, Jr.....1896

Fort Dodge.
Oleson, Olaf Martin.....1877

Fort Madison.
Schafer, George Henry.....1871

Garner.
Collins, Carrie Smith.....1895

Iowa City.
Boerner, Emil Louis 1877

Keokuk.
Kiedaisch, John Frederick, Jr.....1893

Mason City.
Burns, Edwin Miller 1897

Muscatine.
Braunwarth, Alice Louisa.....1892

Oskaloosa.
Pickett, John Harvey 1887

Sioux City.
Arnold, Charles Frederick.....1891
Moore, Silas Harwood 1880
Scherling, Gustav.....1884

Stuart.
Treat, Joseph Augustus.....1885

Waterloo.
Wangler, Conrad David 1876

Wellsburg.
Heddens, Claus Heising.....1893

KANSAS.

Argentine.
McGeorge, William.....1895

Fort Riley.
Temple, Oscar Fitzhugh 1897

Gypsum City, Saline Co.
Schmitter, Jonathan.....1892

Hutchinson.
Ardery, Lorimer 1895

Lawrence.
Leis, George.....1869
Moore, John Thomas 1888
Sayre, Lucius Elmer 1883
Woodward, Brinton Webb.....1895

Leavenworth.
Mehl, Henry William 1892

Ottawa.
Becker, Charles Louis 1892

Topeka.
Merrell, Ashbel Hill.....1884
Washburn, Harry Monroe 1890

KENTUCKY.

Covington.
Belt, James Ferris 1892
Pieck, Edward Ludwig 1887
Zwick, Karl George.....1899

Flemingsburg.
Reynolds, John Jefferson 1876

Frankfort.
Averill, William Henry.....1874
Gayle, John William 1891

Henderson.
McFarland, Robert Mumford.....1893

Louisville.
Beckman, Oscar Albert.....1879
Bell, Emil Remigius.....1899
Diehl, Conrad Lewis 1863
Dilly, Oscar Charles.....1888
Dimmitt, Addison.....1895
Jones, Simon Newton 1870
Newman, George Abner 1866
Overstreet, William Payne 1893
Peter, Minor Cary.....1894
Peyton, Robert Docker.....1887
PFINGST, FERDINAND JOHN.....1867
Schiemann, Edward Bernard 1880
Schoettlin, Albert John.....1882
Snyder, Robert Johnson 1887
Thieman, John Henry, Jr 1896
Troxler, Constantine, Jr 1896
Votteler, William 1895

Shelbyville.

Preissler, Henry Webber.....1893

Somerset.

Porter, Chilton Scott.....1882

Uniontown.

Hardigg, William Leopold.....1881

LOUISIANA.

Bayou Goula.

Viallon, Paul Louis.....1870

Hammond.

Brewer, John Weems.....1893

New Iberia.

Lee, James Augustin.....1856

New Orleans.

Finlay, Alexander Kirkwood.....1883
Godbold, Fabius Chapman.....1887
Grambois, Augustin.....1891
Kaczoroski, Adolph Onesime.....1895
Keppler, Christian Lewis.....1882
Legendre, Joseph Amilcar.....1891
Levy, William Michael.....1894
Lyons, Isaac Luria.....1875
May, Eugene.....1891
Metz, Abraham Lewis.....1887
Miller, Charles.....1897
Otto, John Nicholas Washington.....1891
Quayle, Thomas Andrew.....1897
Taylor, Walter Thomas.....1891
Wunderlich, Edward.....1891

Plaquemine.

Hiriart, Sebastian.....1891

Port Allen.

Charroppin, Emile Lafond.....1891

MAINE.

Auburn.

Robinson, William Allen.....1892

Augusta.

Partridge, Charles Kimball.....1867
Partridge, Frank Reuben.....1895

Bangor.

Harlow, Noah Sparhawk.....1859
Sweet, Caldwell.....1881

Bath.

Anderson, Samuel.....1876

Biddeford.

Boynton, Herschel.....1875

Kittery.

Trefethen, Frederick James.....1899

Lewiston.

Lowell, Edward Mark.....1896
Moulton, Daniel Pierce.....1891

Machias.

Crane, Frank Trussel.....1894

Orono.

Jackman, Wilbur Fisk.....1899

Pittsfield.

Libby, Henry Fitzgerald.....1882

Portland.

Broe, James Augustine.....1898
Drew, Walter Israel.....1896
Earl, Noble Clarkson.....1894
Frye, George Carlton.....1879
Goold, Joseph Edwin.....1896
Hay, Edward Allston.....1889
Heseltine, Daniel Wilber.....1896
McClearn, Henry Trefethen.....1896
Perkins, Benjamin Abbott.....1878
Schlotterbeck, Augustus George.....1896

Saco.

Sawyer, Charles Henry.....1896

South Windham.

Rand, Daniel Moulton.....1892

Waterville.

Dorr, George Watson.....1899

MARYLAND.

Baltimore.

Appleby, Samuel Norwood.....1899
Base, Daniel.....1898
Baughman, John Henry.....1899
Beck, John Godlove.....1899
Brack, Charles Emil.....1876
Brickman, Arthur Otto.....1898
Burrough, Horace.....1883
Caspari, Chas., Jr.....1883
Caspari, William, Jr.....1898
Corning, Albion James.....1898
Culbreth, David Marvel Reynolds.....1883

Davis, John Alexander 1894
Dohme, Alfred Robert Louis 1891
Dohme, Charles Emile 1863
Dohme, Charles Louis 1899
DOHME, LOUIS 1859
ELLIOTT, HENRY ALEXANDER 1859
Emich, Columbus Valentine 1863
Foster, James Webb 1894
Fouch, William M. 1898
Frames, John Fuller 1890
Gilpin, Henry Brooke 1889
Gosman, Adam John 1870
Hall, Robert Edmund Lee 1898
Hancock, John Francis 1863
Hancock, John Henry 1870
Hynson, Henry Parr 1890
Jenkins, William Edgar 1898
Kammer, Daniel Alexander 1898
Kelly, John Ignatius 1898
Kornmann, Henry 1899
Lindeman, Harry Frederick 1898
Maisch, Henry 1898
Mansfield, Samuel 1898
Millard, David Rockwell 1899
Morgan, Charles 1899
Muth, George Lewis 1894
Muth, John Clement 1898
Muth, John Sebastian 1898
Nattans, Arthur 1883
Nordmann, Herman 1895
Pennock, Edward 1898
Pilson, Abram Owen 1898
Quandt, Arthur Albert 1894
Quandt, Ernest Edmund 1894
Richardson, Thomas Leonard 1895
Robinson, Samuel Le Roy 1898
Schrader, August Christian 1898
Schulze, Louis 1892
Sharp, Alpheus Phineas 1855
Simon, William 1885
Smith, Theodric 1890
Streett, Edmund Oldfield 1898
Stuart, William Alexander 1898
Thomas, John Benjamin 1898
Thompson, Albert Eccleston 1898
Vellines, Davies 1895
Ware, Charles Howard 1898
Westcott, James Walling 1890
Wiesel, John Martin 1898
Williamson, Robert Edward Lee 1898
Winkelmann, Henry Christian 1898
WINKELMANN, JOHN HENRY 1864

Cambridge.

DeReeves, Antonio Eugene 1898

Cumberland.

Hermann, John George 1878

Frederick City.

Schley, Steiner 1878

Hagerstown.

Aughinbaugh, David Culbertson 1898
Mumma, Daniel Edgar 1897
Walts, Charles Conley 1898
WINTER, JONAS 1863

Snow Hill.

Powell, William Cottingham 1895

Taneytown.

McKinney, Robert Sentman 1898

MASSACHUSETTS.

Athol.

Burton, William Arthur 1896

Boston.

Baird, Julian William 1894
Bassett, Charles Harrison 1867
Boyden, Edward Cleveland 1874
Burnham, Alfred Augustus, Jr 1891
Burwell, Arthur C. 1899
CANNING, HENRY 1865
Capper, William Ernest 1892
Chapin, William Arms 1880
Colton, James Byers 1865
COOMBS, CHARLES EVERETT 1897
Cramer, Max 1881
Doliber, Thomas 1859
Douglass, Stephen William 1898
DRURY, LINUS DANA 1871
Durkee, William Carley 1885
Ewing, Mary Steele 1898
French, John Innes 1894
Gammon, Irving Parker 1891
Godding, John Granville 1875
Hayes, James Henry 1892
Hedley, Thomas Albert 1893
Jones, James Taber 1875
Kelley, Edward Samuel 1871
Lauricella, Felice 1896
Lewis, Ernest Grant 1892
Lowd, John Colby 1871
Markoe, George Burger 1897
Morse, Edwin Timothy 1897

Patton, Ichabod Bartlett 1858
Pfaff, Franz 1899
Pierce, William Herbert 1879
Prescott, Horace Augustus 1875
Sawyer, William Frederick 1885
Scoville, Wilbur Lincoln 1891
Sharples, Stephen Paschell 1875
SHEPPARD, SAMUEL AIRUS DARLINGTON. 1865
Siegemund, Charles Augustus 1882
Smith, Linville Holton 1892
Stowell, Daniel 1875
Tilden, Amos Kendall 1892
Tucker, Greenleaf Robinson 1890
Vargas-Heredia, Jorge 1891
Varney, Edward Francis 1892
Wells, Edwin Herbert 1893
West, Charles Alfred 1892
Wheeler, William Dexter 1892
Williams, George Gorham 1888
WILSON, BENJAMIN OSGOOD 1859
Wood, Edward Stickney 1879

Brockton.

Randall, Frank Otis 1893

Cambridge.

Claflin, Walter Addison 1896
Lynch, Frank Herman 1897
Phillips, Carrie Elizabeth 1894

Cambridgeport.

La Pierre, Elie Henry 1892
Laing, Alfred Allan 1888
Norton, George Edward 1895
ORNE, JOEL STONE 1859

Charlestown.

Marshall, Ernest Clifton 1875
STACEY, BENJAMIN FRANKLIN 1860

Chelsea.

BUCK, JOHN 1855
Buck, John Lynian 1883
Graham, Joseph Henry 1897

Concord.

Richardson, Horatio Stillman 1892

East Weymouth.

Hoyt, George Melvin 1875

Fall River.

Riddell, Benjamin Franklin 1892

Fitchburg.

Estabrook, Henry Arthur 1886

Holyoke.

Ball, Charles Ely 1885

Jamaica Plain.

Ernst, Frank Frederick 1891

Lawrence.

Glover, William Henry 1891

Lee.

Pease, Francis Merrick 1880

Lowell.

Bailey, Frederick 1869
Butler, Freeman Hall 1874
Hood, Charles Ira 1871
Robinson, Edward Augustus 1888
Thomasson, Anders 1892

Malden.

Keaney, James John 1899

Marlborough.

Hartshorn, Frederick Arthur 1880

Melrose.

Larrabee, John 1897

New Bedford.

Blake, James Edwin 1866
Bunker, Elihu 1885
Shurtleff, Israel Hammond 1875

Newburyport.

Davis, Charles Leland 1897
Goodwin, William W. 1853

Newton.

Crowdle, John Edward 1894
Hudson, Arthur 1882

North Andover Depot.

WHITNEY HENRY MARTIN 1859

Pittsfield.

Hydren, Carl 1892
Manning, John Henry 1889

Raynham.

Crossman, George Alvin 1872

Rockland.

Estes, Joseph Joslyn 1870

Rockport.

Blatchford, Eben 1857

Salem.

Nichols, Thomas Boyden 1876
Price, Charles Henry 1882
Price, Joseph 1888

Shelburne Falls.

Baker, Edwin 1875

Stoneham.

Drake, Frederick Townsley 1894
Patch, Edgar Leonard 1872
Ward, Charles Abraham 1891

Worcester.

Guerin, James Francis 1898
Harris, Francis Mason 1894
Scott, George Theodore 1883

MICHIGAN.

Ann Arbor.

Eberbach, Ottmar 1869
Gordin, Harry Mann 1899
Mann, Albert 1889
Prescott, Albert Benjamin 1871
Schlotterbeck, Julius Otto 1888
Stevens, Alonzo Burdette 1885

Armada, Macombe Co.

Phillips, Edwin Freeman 1888

Corunna.

Reidy, Michael 1894

Detroit.

Girling, Robert Nash 1876
Hall, William Alanson 1888
Helfman, Joseph 1894
Houghton, Elijah Mark 1899
Knox, James Wesley Thompson 1898
Lyons, Albert Byron 1885
Maguire, Eduord Sylvester 1897
Mason, Harry Beckwith 1896
Perry, Frederick William Riley 1885
Seltzer, Leonard Adams 1899
Sherrard, Charles Cornell 1893
Stearns, Frederick 1897
Stearns, Henry Albyn 1888
Vernor, James 1866
Warren, William Matthew 1889

Flushing.

Sprague, Wesson Gage 1895

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871
Osseward, Cornelius 1897
Todd, Albert May 1885

MINNESOTA.

Duluth.

Boyce, Samuel F. 1871
Sweeney, Robert Ormsby 1866

Faribault.

Hawley, William Bentley 1895

Granite Falls.

Johnson, Knute Alfred 1897

Heron Lake.

Kellam, Charles Roderick Judson 1895

Jackson.

Portmann, Cæsar Augustus 1897

Jasper.

Johnson, Louise Loretto (Mrs.) 1898

Minneapolis.

Allen, E. Floyd 1885
Danek, John Francis 1895
Gamble, Stewart 1897
Huhn, Charles Hugo 1897
Huhn, George 1884
King, George Alexander Newton 1892
Lariviere, Telesphore 1896
Peterson, Johannes Otto 1895
Rauch, Henry 1897
Thompson, Albert Delano 1895
Wanous, Josephine Anna 1897
Webster, Hendrick Gordon 1895
Wittich, Matthew Henry 1897
Wulling, Frederick John 1893

Monticello.

Lynch, Robert Fulton 1897

New Ulm.

Eckstein, Andrew Joseph 1895

Ortonville.

Nielson, John 1897

Pelican Rapids, Otter Tail Co.

Axness, Ole Mikkelson 1895

Spring Valley.

Rohde, Claus Frederick 1885

St. Louis Park.

Fink, Frederick William.....1886

St. Paul.

Collier, William Kelly.....1897
Frost, William Arthur.....1892
Getty, Wilmot Stevenson 1896
Heller, Charles Tomkins.....1895
Warren, Edwin Alonzo.....1887
Zimmermann, Bernard 1895

Warren.

Whitney, Edgar Francis 1897

Wilmar.

Carlson, Swan B.....1897
Elfstrum, Axel Fridolf.....1897

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William.....1883

Meridian.

Moore, Joshua Forrest 1891

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

Aux Vasse.

Craighead, Gordon Garriet 1895

Boonville.

Mittelbach, William.....1891
Wooldridge, Daniel Turley.....1890

Carrollton.

PETTIT, HENRY MCEWEN.....1860

Excello, Macon Co.

Powell, William David.....1898

Freeman.

Dolan, Frank Linley.....1888

Jefferson City.

Brandenberger, Adolph... 1894

Kansas City.

Crampton, Ferd Leslie.....1896
Eyssell, George.....1889
Hess, Paul Ludwig 1892
Krueger, Owen William 1897
Walker, David 1894

Kirkwood.

Hemm, Louis Phillips.....1894

Lebanon.

Farrar, Samuel Richard.....1891

Louisiana.

Sombart, John Edward 1881

Mexico, Audrain Co.

LLEWELLYN, JOHN FREDERICK 1867

Rich Hill.

Youngs, William.....1883

St. Joseph.

Clark, James Ryland 1895

St. Louis.

Allen, John Hays.....1898
Blank, Alois 1881
Boehm, Solomon 1871
Good, James Michener 1871
Grandjean, Eugene.....1871
Hassebrock, Henry Fred 1884
Hemm, Francis.....1881
Hinrichs, Gustavus Detlef.....1895
Kaenter, Frederick William 1897
Klie, George Henry Charles.....1878
Layton, Thomas.....1892
Mallinckrodt, Edward 1869
May, Charles Charlotte 1898
MEYER, CHRISTIAN FRIED. GOTTLIEB.1860
Morley, William Jarman 1876
Noll, Martin James..... 1898
Pauley, Frank Charles.....1879
SANDER, ENNO.....1858
Scheffer, Henry William.....1863
Schurk, Louis.....1890
Schweikhardt, Richard 1890
Uhlich, Ferdinand Gottlieb.....1881
Vitt, Rudolph Simon.....1895
Vordick, August Henry 1874
Walerius, Mathias 1897
Wall, Otto Augustus 1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton.....1887
Whitcomb, Frederick Ezekiel.....1888
Wilson, Charles Frederick.....1891
Wurmb, Theodore Henry.....1890

Webster Grove, St. Louis Co.

Mueller, Ambrose.....1894

West Plains.

Curry, Alfred Mustoon.....1897

MONTANA.

Helena.

Starz, Emil Alfred.....1895

NEBRASKA.

Fairbury.

Pease, Autumn Vine.....1893

Fort Niobrara.

Denning, Michael.....1897

Fremont.

Brunner, Charles Henry.....1895

Grand Island, Hall Co.

Buchheit, Augustus William.....1893

Omaha.

Kuhn, Norman Archibald.....1878
Mares, Ferdinand Louis.....1897
Myers, Preston B.....1897
Schmidt, Joseph H.....1897
Sherman, Charles Rollin.....1889

NEVADA.

Winnemucca.

Brown, William Ambrose.....1893

NEW HAMPSHIRE.

Derry Depot.

Bell, Samuel Howard.....1890

Groveton.

Wilson, John March.....1897

Littleton.

Robins, Wilbur Fiske.....1892

Manchester.

Baril, Joseph Benjamin.....1892

Nashua.

Whitman, Nelson Samuel.....1875

New Market.

Dearborn, George Luther.....1853

Portsmouth.

Grace, William Day.....1896
Green, Benjamin.....1888
Jorgenson, Hans Christian.....1899
Preston, Andrew Peabody.....1881
Walts, David Yarnall.....1897

Somersworth.

Hurd, John Charles.....1892
MOORE, GEORGE.....1859

NEW JERSEY.

Atlantic City.

Wescott, William Carter.....1896

Bayonne.

Alpers, William Henry.....1898

Beverly.

Dougherty, Samuel Edward.....1875

Bloomfield.

Scherff, John Philip.....1877

Bordentown.

Carslake, George Middleton.....1880

Bridgeton.

Dare, Charles Ford.....1889

Camden.

Beringer, George Mahlon.....1893

East Orange.

Davis, William Mortimer.....1879
Williams, Seward Whiting.....1887

Elizabeth.

Frohwein, Richard.....1867
Kent, Henry Avery, Jr.....1880
Oliver, William Murray.....1875

Englewood.

Rockefeller, Lucius.....1880

Freehold.

Walker, John Putnam.....1881

Hoboken.

KLUSSMANN, HERMANN.....1876
Lampa, Robert Raymond.....1892

Jersey City.

Abernethy, Maxwell.....1865
Beardmore, William Arthur.....1890
Foulke, James.....1881
Gallagher, John Charles.....1893
Hartnett, Eugene.....1893
Lohmann, Herman Joseph.....1896
Lyons, Fred. Wyckoff.....1893

Vockroth, Emil 1893
White, George Henderson 1868

Keyport.

Warn, William Edgar 1886

Lakewood, Ocean Co.

Harrison, William John 1896

Madison.

Brown, William Thompson 1894

Matawan, Monmouth Co.

Slater, Frank Hovey 1882

Medford.

Thorn, Henry Prickett 1879

Morristown.

Carrell, Eugene Ayres 1875

Newark.

Betzler, Jacob 1880
Holzhauer, Charles 1873
Menk, Charles William 1898
Mennen, Gerhard 1888
Sayre, William Henry 1877
Smith, Charles Bradley 1868
Smith, Clarence Pennington 1890
Staebler, Richard Elimar Johannes ... 1892
Staehle, Louis Lorenz 1898
Stamford, William Harrison 1876
Van Winkle, Abraham 1871
Wuensch, Charles 1898

New Brunswick.

Kilmer, Frederick Barnett 1886

Perth Amboy.

Parisen, George Warren 1892

Plainfield.

Olhf, James Henry 1867
Reynolds, Howard Prescott 1875
Shaw. Robert Johnson 1875

Riverside.

Pine, Warren Carleton 1897

Rutherford.

Cameron, Donald Lochiel 1897

Somerville.

Cook, Gilbert Snowden 1886

South Amboy.

Jacques, George Washington 1869
Parisen, Allen Conrey 1895

NEW MEXICO.

Hillsborough.

Nowers, Lawrence Edward 1892

NEW YORK.

Albany.

Bradley, Frank Henry 1896
Bradley, Theodore James 1896
Gaus, Charles Henry 1879
Huested, Alfred Birch 1879
Michaelis, Gustavus 1882
Turner, George Heather 1880
Walker, William John 1880

Binghamton.

Otis, Clark Zelotes 1886

Brooklyn.

Bartley, Elias Hudson 1893
Brooks, George Washington 1879
Brundage, Albert Harrison 1892
Colen, James Austin 1892
DeForest, William Pendleton 1879
DeJonge, Cornelius 1899
Dennin, Charles 1875
Dennin, Edwin Clinton 1892
Dewender, William Henry 1896
Douglass, Henry 1875
Dunn, John Augustus 1867
DuPuy, Eugene 1852
Eccles, Robert Gibson 1885
Englander, Samuel 1899
Fougera, Edmund Charles Henry 1890
Haviland, Henry 1857
Henry, Hubert 1897
Klock, George Hiram 1897
Krieger, Philip 1876
Levy, Adolph 1877
McElhenie, Thomas Diamond 1872
McMahon, Joseph 1897
Owens, Richard John 1860
Ray, Peter William 1892
Rosenzweig, Benjamin 1898
Snyder, Ambrose Chancellor 1867
Squibb, Edward Hamilton 1882
Squibb, Edward Robinson 1858
Topping, Charles Orlando 1899
Tuthill, Frederic Percival 1899
Webber, Joseph LeRoy 1886
Werner, Rudolph Carl 1892
Zellhoefer, George 1876

Buffalo.

Gregory, Willis George.....1886
Hayes, Horace Phillips.....1880
Lockie, James Alexander ... .1896
Peabody, William Huntington 1857
Rano, Charles Orlando 1866

Catskill.

Du Bois, William Laneman 1880

Corning.

Cole, Victor Le Roy.....1890

Croton-on-Hudson.

Henry, Charles (Dworniczak) 1881

Dunkirk.

Davis, Eugene Miller ..... .1892

Elmira.

HOLMES, CLAY WOOD.....1873

Fillmore, Alleghany Co.

Ridgway, Lemuel Augustus 1882

Fishkill-on-Hudson.

Moith, Augustus Theodore 1860

Flushing.

Hepburn, John 1873

Geneseo, Livingston Co.

Rogers, Arthur Henry.....1882

Groton.

Rhodes, Charles Orman 1895

Jamaica, Queens Co.

Baylis, Lewis Fosdick 1880
Goodale, Harvey Galusha..... 1879
Peck, George Lyman.....1883

Jamestown.

Winnberg, John Magnus.....1892

Middletown.

KING, JAMES THEODORE.....1859
Rogers, William Henry 1869

Mount Vernon.

Blackmore, Henry Spencer 1896
Gill, George 1872

Newburgh.

Chapman, Isaac Close.....1887

New Rochelle.

Thomason, Richard John 1897

New York City.

Allison, William Outis.....1895
Alpers, William Charles 1890
Amend, Bernard Gottwald ..... .1892
Amend, Otto Paul 1892
Balser, Gustavus.....1875
Billings, Henry Merry..... 1869
Boeddiker, Otto 1895
Chandler, Charles Frederic.....1867
Coblentz, Virgil 1882
Cook, Thomas Penrose 1877
Diekman, George Charles.....1898
Erb, Charles Stephan 1898
Ewing, John.....1893
Fairchild, Benjamin Thomas 1875
Fairchild, Samuel William 1887
Fraser, Horatio Nelson.....1888
Freid, Isadore.....1897
Gane, Eustace Harold.....1895
Gardner, Robert Winslow..... 1867
Geisler, Joseph Frank 1889
Gregorius, George Gustavus Chas. Wm.1898
Hauenstein, William.....1883
Haynes, David Oliphant.....1887
Heydenreich, Emile 1867
Hopkins, Jesse L.....1898
Hudnut, Alexander.....1857
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Jelliffe, Smith Ely.....1895
Jungmann, Julius.....1879
Kalish, Julius 1875
Keenan, Thomas John.....1894
Kemp, Edward.....1888
Kennedy, Ezra Joseph.....1887
Kent, Robert Restieaux.....1855
Kirchgasser, William Charles.....1888
Kneuper, George 1897
Kneuper, George Martin.....1897
Louis, Leopold George 1897
Lovis, Henry Christian.....1892
Main, Thomas Francis.....1872
Massey, William Morton.....1885
Mayo, Caswell Armstrong.....1893
McIntyre, Byron Floyd 1876
McIntyre, Ewen 1873
McKesson, George Clinton.....1888
McKesson, John, Jr.....1867
MILHAU, EDWARD LEON.....1858
Molwitz, Ernest.....1867

Murray, Benjamin Lindley 1896
Myers, William Henry 1897
O'Neil, Henry Maurice 1879
Osmun, Charles Alvin 1868
Parsons, Charles West 1899
Peters, John Miller 1896
Plaut, Albert 1894
Pleasants, Charles Henry 1890
Quackinbush, Benjamin Franklin 1886
RAMSPERGER, GUSTAVUS 1860
Reynolds, Charles Edward 1897
Rice, Charles 1870
Runyon, Edward Wheelock 1875
Rusby, Henry Hurd 1890
Sayre, Edward Augustus 1877
Schieffelin, William Jay 1892
Schimpf, Henry William 1894
Schmid, Henry 1887
Schmidt, Ferdinand Traugott 1886
SEABURY, GEORGE JOHN 1876
Sieker, Ferdinand August 1893
Skelly, James Joseph 1866
Smith, Reuben Randolph 1890
Stewart, Francis Edward 1884
Takamine, Jokichi 1898
Tsheppe, Adolph 1876
Wichelns, Frederick 1881
Wickham, William Hull 1870
Wilson, William 1876

Oswego.

Butler, Charles Henry 1887

Plattsburgh.

Hitchcock, John E. 1892

Port Henry.

Smith, Edward Salvister 1890

Richfield Springs.

Smith, Williard Alfred 1880

Saratoga Springs.

Fish, Charles Frederick 1866
Pennington, Thomas Henry Sands 1877

Syracuse.

Burdick, Frederick Richard 1897
Dawson, Edward Seymour, Jr. 1876
Muench, William 1899
Snow, Charles Wesley 1876

Utica.

Blaikie, William 1879
Maine, August 1892

Wellsville, Alleghany Co.

Hall, Edwin Bradford 1879

Willard.

Rich, Willis Simmons 1882

Yonkers.

Eschman, Frederick William Rudolph . 1880
Petsche, Franz Fred. Bismark Wilhelm . 1892

NORTH CAROLINA.

Asheville.

Smith, Whitefoord Gamewell 1892

Charlotte.

Wearn, William Henry 1888

Concord.

Johnson, Daniel Dudley 1894

Durham, Orange Co.

Vaughan, Parry Wyche 1882
Yearby, William Morgan 1894

Mt. Airy.

Banner, John 1898

Oxford.

Hancock, Franklin Willis 1888

Raleigh.

Birdsong, Edwin Grey 1898
Bobbitt, James Henry 1894
Hicks, Henry Thomas 1898
Simpson, William 1873

Tarboro.

Macnair, Whitmel Horne 1898
Zoeller, Edward Victor 1878

Wilmington.

Hardin, John Haywood 1881

NORTH DAKOTA.

Cavalier.

Ulm, Albert Gustave 1897

Fargo.

Christianson, Lars 1896

Grafton.

Haussamen, Henry Louis 1888

Jamestown.

White, Herbert Eugene 1897

Lakota.

St. John, Sydney Sylvester.....1897

Valley City.

Lee, Charles John.....1896
Sullivan, John Wilber.....1897

OHIO.

Arcanum.

Johnson, Joseph Henry.....1899

Caldwell.

Bowron, Walter Henry.....1890

Cambridge.

Ogier, John Morrison.....1895

Chillicothe.

Howson, Arthur Bayshawe.....1886
Nipgen, John Alvin.....1879

Cincinnati.

DeLang, Alfred.....1887
Eger, George.....1864
Fennel, Charles Theodore Piderit.....1886
Fieber, Gustavus Adolphus.....1893
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Gordon, William John Maclester....1854
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Serodino, Herman.....1880
Simonson, William.....1887
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Weeks, Benjamin Franklin.....1891
Wetterstroem, Albert Frederick Charles.1888
Wetterstroem, Theodore David.....1897
YORKSTON, MATTHEW MACKAY.....1864
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Arny, Harry Vin.....1891
Asplin, John Harding.....1882
Benfield, Charles William.....1893
Bruce, James.....1882
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Cobb, Ralph Lathrop.....1883
Feil, Joseph.....1885
Foster, Charles Ebenezer.....1898
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Hannan, Owen Burdette.....1893
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Richardson, Samuel William.....1897
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Ink, Charles Elliott.....1885

Columbus.

Bruck, Philip Henry.....1884
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Kauffman, George Beecher.....1882
Rauschkolb, John.....1894
Schueller, Frederick William.....1880

Columbus Barracks.

Griffith, Thomas.....1897

Conneaut, Ashtabula Co.

Symonds, Arthur Henry.....1892

Dayton.

Burkhardt, Mark Anthony.....1887

Delaware.

Pfiffner, Fritz John R.....1894

East Liverpool.

Bulger, Alvin H.....1899

Findlay.

Firmin, John Curtis.....1893

Grand Rapids, Wood Co.

Thurston, Azor.....1886

Jefferson, Ashtabula Co.

Case, Charles Henry.....1892

Logan.

Harrington, Frank.....1869

Massillon, Stark Co.

Kirchhofer, Peter Paul.....1881

Middletown.

Johnson, Charles Brayton.....1876

Navarre.

GROSSKLAUS, JOHN FERDINAND.....1859

New Philadelphia.

Miller, William Harvey.....1898

Scio.

Beal, James Hartley.....1892

Springfield.

Casper, Thomas Jefferson.....1867
Lisle, Justin Dickson.....1894
Siegenthaler, Harvey Newton.....1882

Wooster.

Ohliger, Lewis Philip.....1871

Youngstown.

Cassaday, Orlin Ulysses.....1899

OREGON.

Ashland.

Sherwin, Eugene Alonzo.....1889

Portland.

Blumauer, Louis.....1889

The Dalles.

Blakeley, George Clarence.....1892

PENNSYLVANIA.

Allegheny City.

Eggers, Frederick Hermann.....1872

Beaver, Beaver Co.

Andriessen, Hugo.....1875

Carlisle.

Horn, Wilbur Fisk.....1876

Chambersburg.

Keefer, Charles DeWalt.....1891

Connellsville.

Berryhill, Henry Pennick.....1890

Du Bois.

Hay, Charles La Mar.....1898

Harrisburg.

George, Charles Theodore.....1873
Gorgas, George Albert.....1884
Gross, Edward Ziegler.....1883
Miller, Jacob Augustus.....1873
Smith, Benjamin Franklin.....1892

Haverford.

Harbaugh, Wilson Linn.....1896

Lancaster.

Heinitsh, Sigmund William.....1889

League Islana.

Scott, Theodore William.....1899

Lebanon.

LEMBERGER, JOSEPH LYON.....1858
Redsecker, Jacob Henry.....1881

Lock Haven.

Prieson, Adolph.....1880

Mercer.

Graham, Frank Reed.....1897

Norristown.

Reed, Willoughby Henry.....1893

Philadelphia.

BAUER, LOUIS GUSTAVUS.....1867
Bohn, Charles Henry.....1897
Borell, Henry Augustus.....1874
BORING, EDWARD MCCURDY.....1867
Bullock, Charles.....1857
Burg, John Dellinger.....1888
Cliffe, William Lincoln.....1898
Danner, William Edward.....1896
De Graffe, Bertha Leon.....1895
Dobbins, Edwards Tompkins.....1867
Eddy, Henry Clay.....1869
Ellis, Evan Tyson.....1857
England, Joseph Winters.....1893
Feidt, George David.....1898
Fox, Peter Paul.....1869
French, Harry Banks.....1890
Gano, William Hubbell.....1892
Guise, P. Nettleton.....1897

HANCE, EDWARD HANCE 1857
Hassinger, Samuel Ellphat Reed 1880
Haussmann, Frederick William 1895
Heintzelman, Joseph Augustus 1858
Hoch, Aquila 1896
Jenks, William Jenks 1858
Jones, Alexander Henry 1874
Kebler, Lyman Frederic 1894
Keeney, Caleb Reynolds 1868
Kline, Mahlon Norwood 1878
Koch, Louis 1872
Kraemer, Henry 1892
Krewson, William Egbert 1875
LaWall, Charles Herbert 1896
Lincoln, George Washington 1899
Lowe, Clement Belton 1895
McIntyre, William 1868
Mellor, Alfred 1864
MILLER, ADOLPH WILLIAM 1868
Milligan, Decatur 1867
Moerk, Frank Xavier 1898
MOORE, JOACHIM BONAPARTE 1860
Morison, John Louis Dales 1895
Morris, Lemuel Iorwerth 1880
Mulford, Henry Kendall 1896
Ottinger, James Jeremiah 1876
Peacock, Josiah Comegys 1892
Perot, Thomas Morris 1857
Pile, Gustavus 1881
Potts, David Gardiner 1893
Preston, David 1868
Procter, Wallace 1874
REMINGTON, JOSEPH PRICE 1867
Rittenhouse, Henry Norman 1857
Ryan, Frank Gibbs 1892
Sadtler, Samuel Philip 1893
Shafer, Erwin Clement 1893
Shimer, Miles Herman 1897
SHINN, JAMES THORNTON 1860
Shoemaker, Richard Martin 1869
Stedem, Frederick William Edward ... 1892
Thompson, William Beatty 1858
Warner, William Richard 1857
Webb, William Henry 1867
Weidemann, Charles Alexander 1868
Wendell, Henry Edward 1873
Wiegand, Thomas Snowden 1857

Pittsburgh.

Emanuel, Louis 1878
Hays, Joseph Anthony 1892
Henderson, Archibald Keys 1888
Kelly, George Armstrong 1882
Koch, Julius Arnold 1892

Pottsville.

Diebert, Thomas Irvin 1882
Kennedy, George Washington 1869

Reading.

Weida, Charles Arthur 1896
Ziegler, Philip Milton 1867

Shamokin.

Smink, Robert William 1893
Smink, William Henry R 1885

West Chester.

Evans, Joseph Spragg 1877

Williamsport.

Cornell, Edward Augustus 1873
Duble, Jesse Balderston 1870

York.

Alexander, Charles Ellis 1899
Patton, John Franklin 1880

RHODE ISLAND.

Narragansett Pier.

Tobin, John Martin 1887

Newport.

Baker, Maury Davison 1897
Cotton, William Henry 1885
Downing, Benjamin Franklin, Jr 1886
Huntington, William Hunter 1891
Wood, John William 1897

Providence.

Blanding, William Oliver 1894
Danforth, Edmund Culver 1878
Fenner, Alexander Wilson, Jr 1888
Gilbert, Charles Atwood 1891
Greene, William Ray 1883
Lyon, George Calvin 1899
O'Hare, James 1888
Pearce, Howard Anthony 1894
Potter, William Robert 1894
Reynolds, William Keys 1876
Wood, Mason Bowen 1882

Westerly.

Collins, Albert Burlingame 1882

Woonsocket.

Simmons, Frank Birtles 1897

SOUTH CAROLINA.

Anderson.

Wilhite, Frank Turner.....1893

Charleston.

Aimar, Charles Pons 1879
Plenge, Henry Charles..... 1894

Columbia.

Thomas, Oscar Ernest.....1882

Greenville.

Carpenter, Alfred Baxter.....1898

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Robertson, Peter 1896

SOUTH DAKOTA.

Dell Rapids.

Bent, Edward Clarence.....1897

Sioux Falls.

Dunning, LymanTylor 1897

Watertown.

Jones, David Franklin.....1895

Yankton.

Brecht, Frederick Adolph.....1895

TENNESSEE.

Chattanooga.

Greve, Charles Mathias.....1887
Voigt, Joseph Frederick 1893

Clarksville.

Lockert, Charles Lacy.....1894

Columbia.

Rains, Aris Brown.....1894

Knoxville.

Rosenthal, David Abraham 1894

Memphis.

Peck, Frank Hugh.....1897
ROBINSON, JAMES SCOTT.....1869
Treherne, John Curtis 1894

Nashville.

Burge, James Oscar 1878
Davis, Edward Benjamin 1896
Ruddiman, Edsel Alexander.....1894
Steiner, Samuel Gideon 1899

TEXAS.

Dallas.

De Lorenzi, Albert.....1890
Eberle, Eugene Gustavus.....1896

El Paso.

Irving, William Armstrong.....1879

Galveston.

Cline, Raoul Réné Danniel.....1898
Orton, Ingomar Francois 1891

Houston.

Burgheim, Jacob 1892

Paris.

Greiner, William Edward 1892

San Antonio.

Dreiss, James Edward 1898
Forston, Keene Richards.....1899
Pfeiffer, John 1898
Schmitt, George Joseph Francis.....1890

Sherman.

Sheehey, Henry Lee 1898

Taylor.

Thames, Joseph Jefferson 1895

Van Alstyne.

Neathery, James Miller 1892

UTAH.

Salt Lake City.

Druehl, Frank August.....1889
Hill, Frederick John 1895

VERMONT.

Brattleboro.

Root, Wilfred Franklin.....1898

Fort Ethan Allen.

Cabell, Henry Otto 1897

Montpelier.

Blakely, Collins 1899
Greene, Lester Henry 1899
Slade, Harry Allen.....1899
Terrill, Willis Ethel.....1899

Northfield.

Sanborn, George Cassius 1899

Rutland.

Higgins, Albert Warren 1895

St. Albans.

Dutcher, Alfred Luther.....1892

St. Johnsbury.

Bingham, Charles Calvin.....1875

VIRGINIA.

Charlottesville.

Maphis, Charles Gilmore.....1898

Danville.

Cole, Howson White 1882
Goldsborough, Charles Henry.....1898
Neal, Charles Chaplin 1899

Falls Church.

Church, Merton Elbridge 1892

Fredericksburg.

Hall, Horace Byrd.....1896

Newport News.

Burgess, William Gaither 1898
Klor, Alexander Edward George.....1899

Norfolk.

Kolb, William Walter 1897
MacRae, John Young 1894
McLarty, Colin.....1898
Price, Roger Taylor 1899

Richmond.

Baker, Thomas Roberts.....1856
Briggs, Andrew Gessner 1890
Harrison, Richard Heth Munford....1895
Miller, Turner Ashby.....1894
Scott, William Henry 1873
Slaughter, Philip Mercer.....1897

Roanoke.

Massie, Paul 1899

South Boston.

Faulkner, Garland Estes 1898

WASHINGTON.

Fort Walla Walla.

Krick, Charles Augustus 1898

La Connor, Skagit Co.

Joergensen,Gerhard JohanCarl Sophus.1889

Pullman.

Watt, George Henry 1896

Seattle.

Holmes, Henry Elliott 1880

Snohomish.

Wilbur, Lot.....1896

Tacoma.

Cummings, Henry Thornton.....1853

WEST VIRGINIA.

Wheeling.

Williams, William Hudson.....1880

WICONSIN.

La Crosse.

Beyschlag, Charles.....1880

Madison.

Kremers, Edward..... 1887

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius 1884

Medford.

Hammel, Joseph 1887

Milwaukee.

Conrath, Adam.....1881
Dadd, Robert Morrow.....1896
DRAKE, JOHN RANSOM.....1860
Frank, Hermann Otto.....1898
Kettler, Edward, Jr.....1896
Kienth, Hans 1884
Ruenzel, Henry Gottlieb.....1892
Schrank, Charles Henry 1876

Neillsville.

Sniteman, Charles Clarence 1881

WYOMING.

Rawlins.

Stuver, Emanuel.....1895

DOMINION OF CANADA.

MANITOBA.

Winnepeg.

Flexon, Charles..... ..1897

NEW BRUNSWICK.

St. John.

Coupe, Robert Edward 1894

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876

ONTARIO.

Hamilton.

Clark, John Alexander 1890

Ottawa.

SAUNDERS, WILLIAM 1860
Watters, Henry 1896

Stratford.

WAUGH, GEORGE JAMES 1862

Toronto.

Heebner, Charles Frederick 1894
Holgate, Francis Heasell 1895
Robinson, Ernest Frankish 1889

Windsor.

D'Avignon, John Eugene 1888

Woodstock.

Karn, William Alfred 1898

QUEBEC.

Lachine.

Ranson, Edward Alphonse 1897

Montreal.

Baridon, Louis Richard 1890
Chapman, William Henry 1895
Gray, Henry Robert 1867
Howey, John Joseph 1896
Lachance, Seraphin 1888
Lanctot, Henri Raymond 1894
Morrison, Joseph Edward 1888
Muir, Ebenezer 1895
Reed, Thomas Dennis 1896
Tremble, John Edward 1896

Quebec.

Dubé, J. Edmond 1897
Power, John J 1897
Willis, Henry 1897

Three Rivers.

Williams, Richard Wellington 1883

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Graham, Clarence Montrose, Manila, P. I 1897
Heyl, James Bell, Hamilton, Bermuda 1863
Martin, Nicholas Henry, Gateshead on Tyne, England 1891
POWER, FREDERICK BELDING, London, England 1872
Rumsey, Samuel Louis, Honolulu, Hawaiian Islands 1876
St. Cyr, Etienne Laurent Nelvil, Aux Cayes, Hayti, W. I. 1897
WELLCOME, HENRY SOLOMON, London, England 1875

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Campbell, Marion J 1897
Joyce, Robert 1895
Leitch, Arthur 1860
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Hoch, Aquila,
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90 Meadow st., New Haven, Conn.
Holgate, Francis H.,
43 King st. W., Toronto, Can.
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Hopkins, Jesse L.,
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Horn, Wilbur F.,
32 West Main st., Carlisle, Pa.
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423 N. Charles st., Baltimore, Md.
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Irvin, William A.,
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Jackman, Wilbur F.,
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Joergensen, Sophus,
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Joerger, Frederick,
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Johnson, Charles B.,
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Johnson, D. Dudley,
Concord, N. C.
Johnson, Joseph H.,
Arcanum, O.
Johnson, Knute A.,
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Johnson, Louise L., (Mrs.),
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Jones, James T.,
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Lueder, Fritz,
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Lundberg, John C.,
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Lynch, Frank K.,
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Lynch, Robert F.,
Monticello, Wright Co., Minn.
Lyon, George C.,
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Lyons, Albert B.,
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May, Eugene,
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May, James O.,
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6th st. & Eggleston ave., Cincinnati, O.
Merrell, George,
6th st. & Eggleston ave., Cincinnati, O.
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Miller, Emerson R.,
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218 Main st., Middletown, Conn.
Plaut, Albert,
128 William st., New York, N. Y.
Pleasants, Charles H.,
61 West Houston st., New York, N. Y.
Plenge, Henry C.,
8 Broad st., Charleston, S. C.
Porter, Chilton S.,
Somerset, Pulaski Co., Ky.

Porter, Millett N.,
3850 State st., Chicago, Ill.
Portmann, Cæsar A..,
Jackson, Jackson Co., Minn.
Potter, William R.,
100 Broad st., Providence, R. I.
Potts, David G.,
24 S. 2d st., Philadelphia, Pa.
Powell, William C.,
Snow Hill, Md.
Powell, William D.,
Excello, Macon Co., Mo.
Power, Frederick B.,
6 King st., Snow Hill, London, Eng.
Power, John J.,
18 St. Famille St., Quebec, Can.
Preissler, Henry W..
Shelbyville, Ky.
Prescott, Albert B.,
University of Michigan, Ann Arbor, Mich.
Prescott, Horace A.,
4 Prescott Place, Dorchester, Mass.
Preston, Andrew P.,
2 Congress Block, Portsmouth, N. H.
Preston, David,
9th & Lombard sts., Philadelphia, Pa.
Price, Charles H.,
226 Essex st., Salem, Mass.
Price, Joseph,
226 Essex st., Salem, Mass.
Price, Roger T.,
Naval Hospital, Norfolk, Va.
Prieson, Adolph,
100 Main st., Lock Haven, Pa.
Procter, Wallace,
1900 Pine st., Philadelphia, Pa.
Puckner, William A.,
73 Wells st., Chicago, Ill.
Punch, William F.,
71 Dauphin st., Mobile, Ala.
Quackinbush, Benjamin F.,
703 Greenwich st., New York, N. Y.
Quandt, Arthur A.,
124 S. Howard st., Baltimore, Md.
Quandt, Ernest E.,
124 S. Howard st., Baltimore, Md.
Quayle, Thomas A.,
1966 Perdido st., New Orleans, La.
Rains, A. Brown,
11 W. 7th st., Columbia, Tenn.
Ramaley, Francis,
University of Colorado, Boulder, Col.
Ramsperger, Gustavus,
236 E. 23d st., New York, N. Y.
Rand, Daniel M.,
Main & Depot sts., S. Windham, Me.
Randall, Frank O.,
101 N. Main st., Brockton, Mass.
Rano, Charles O.,
1872 Niagara st., Buffalo, N. Y.
Ranson, Edward A.,
Lachine, Que., Can.
Rapelye, Charles A.,
325 Main st., Hartford, Conn.
Rauch, Henry,
1228 Main st., N. E., Minneapolis, Minn.
Rauschkolb, John,
251 S. 4th st., Columbus, O.
Ray, Peter W.,
379 S. 2d st., Brooklyn, N. Y.
Redsecker. Jacob H.,
810 Cumberland st., Lebanon, Pa.
Reed, Thomas D.,
91 University st., Montreal, Can.
Reed, Willoughby H.,
Marshall & Astor sts., Norristown, Pa.
Reidy, Michael,
Shiawassee ave., Corunna, Mich.
Remington, Joseph P.,
1832 Pine st., Philadelphia, Pa.
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U.S.R.S.Vermont,NavyYard,NewYork,N.Y.
Reynolds, Howard P.,
71 Washington ave., N., Plainfield, N. J.
Reynolds, John J.,
Water & Main Cross sts., Flemingsburg, Ky.
Rhode, Rudolph E.,
504 N. Clark st., Chicago, Ill.
Rhodes, Chas. O.,
4 Main st., Groton, N. Y.
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Bellevue Hospital, New York, N. Y.
Rich, Willis S.,
Willard State Hospital, Willard, N. Y.
Richardson, Horatio S.,
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Richardson, Samuel W.,
U. S. M. Hospital, Cleveland, O.
Richardson, Thomas L.,
211 W. 25th st., Baltimore, Md.
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Ridgway, Lemuel A..
Fillmore, Allegheny Co., N. Y.

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Churdan, Ia.
Roberston, Felix O.,
Searcy, White Co., Ark.
Robertson, Peter,
Main st., Newberry, S. C.
Robins, Wilbur F.,
28 Main st., Littleton, N. H.
Robinson, Edward A.,
19 Warwick st., Lowell, Mass.
Robinson, Ernest F.,
832 Yonge st., Toronto, Can.
ROBINSON, JAMES S.,
2d & Madison sts., Memphis, Tenn.
Robinson, Samuel L.,
Greene & Franklin sts., Baltimore, Md.
Robinson, William A.,
49 Drummond st., Auburn, Me.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rogers, Arthur H.,
Geneseo, Livingston Co., N. Y.
Rogers, Edward,
U. S. M. Hospital, Evansville, Ind.
Rogers, Henry H.,
224 Court st., Kankakee, Ill.
Rogers, William H.,
North st., Middletown, N. Y.
Rohde, Claus F.,
Spring Valley, Minn.
Rollins, John F.,
Fort George, Duval Co., Fla.
Root, Wilfred F.,
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Rosenzweig, Benj.,
624 Fulton st., Brooklyn, N. Y.
Rowlinski, Robert A.,
104 Broughton st., Savannah, Ga.
Ruddiman, Edsel A.,
Vanderbilt Univ., Nashville, Tenn.
Ruenzel, Henry G.,
753 3d st., Milwaukee, Wis.
Rumsey, Samuel L.,
Fort & Hotel sts., Honolulu, H. I.
Runyon, Edward W.,
242 West 41st st., New York, N. Y.
Ruppert, John,
Price Hill, Cincinnati, O.
Rusby, Henry H.,
115 W. 68th st., New York, N. Y.
Ryan, Frank G.,
145 N. 10th st., Philadelphia, Pa.
Sadtler, Samuel P.,
145 N. 10th st., Philadelphia, Pa.
Sanborn, George C.,
Northfield, Vt.
SANDER, ENNO,
129 S. 11th st., St. Louis, Mo.
Sargent, Ezekiel H.,
125 State st., Chicago, Ill.
Sauer, Louis W.,
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Sauerhering, Rudolph A.,
Main st., Mayville, Dodge Co., Wis.
SAUNDERS, WILLIAM,
Central Experim. Farm, Ottawa, Can.
Sawyer, Charles H.,
52 Main st., Saco, Me.
Sawyer, William F.,
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Glenwood & Wash'tn aves., Bloomfield, N. J.
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170 William st., New York, N. Y.
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Schley, Steiner,
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Schlotterbeck, Julius O.,
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Schmidt, Ferdinand T.,
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Schmidt, Frederick M.,
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Schmidt, Joseph H.,
2402 Cuming st., Omaha, Neb.
Schmidt, Oscar W.,
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Schmidt, Valentine,
Polk & Jackson sts., San Francisco, Cal.
Schmitt, George J. F.,
507 W. Commerce st., San Antonio, Tex.
Schmitter, Jonathan,
Maple st., Gypsum City, Saline Co., Kan.
Schneider, Albert,
2421 Dearborn st., Chicago, Ill.
Schoenhut, Christie H.,
199 Superior st., Cleveland, O.
Schoettlin, Albert J.,
4th & Chestnut sts., Louisville, Ky.
Scholtz, Edmund L.,
16th & Stout sts., Denver, Colo.
Schrader, August C.,
Elliot & Curley sts., Baltimore, Md.
Schrank, C. Henry,
437 E. Water st., Milwaukee, Wis.
Schroeder, John H.,
Burnett ave. & Union st., Avondale, Cin., O.
Schueller, Frederick W.,
232 S. High st., Columbus, O.
Schuh, Paul G.,
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Schulze, Louis,
631 S. Patterson Park ave., Baltimore, Md.
Schurk, Louis,
3201 Olive st., St. Louis, Mo.
Schweickhardt, Richard,
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Scott, Theodore W.,
U. S. S. Richmond, League Island, Pa.
Scott, William H.,
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Selzer, Eugene R.,
1492 Superior st., Cleveland, O.
Sempill, Walter M.,
135 Clark st., Chicago, Ill.
Serodino, Herman,
53 Observatory st., Cincinnati, O.
Sevin, N. Douglas,
141 Main st., Norwich, Conn.
Shafer, Erwin C.,
Green Lane & York Road, Philadelphia, Pa.
Shannon, Thomas R.,
143 Trumbull st., Hartford, Conn.
Sharp, Alpheus P.,
Pratt & Howard sts., Baltimore, Md.
Sharp, Harry,
Junc. Marietta & Walton sts., Atlanta, Ga.
Sharples, Stephen P.,
13 Broad st., Boston, Mass.
Shaw, Robert J.,
3 E. Front st., Plainfield N. J.
Sheehey, Henry L.,
219 E. Pecan st., Sherman, Tex.
SHEPPARD, SAMUEL A. D.,
1129 Washington st., Boston, Mass.
Sherman, Charles R.,
1513 Dodge st., Omaha, Neb.
Sherrard, Charles C.,
121 20th st., Detroit, Mich.
Sherwin, Eugene A.,
Ashland, O.
Sherwood, Henry J.,
979 Woodland ave., Cleveland, O.
Shimer, Miles H.,
Westmoreland & 15th sts., Philadelphia, Pa.
SHINN, JAMES T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
Siegenthaler, Harvey N.,
22 E. High st., Springfield, O.

Sieker, Ferdinand A.,
128 William st.. New York, N. Y.
Simmons, Frank B.,
182 Main st., Woonsocket, R. I.
Simms, Giles G. C.,
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Simon, William,
1348 Block st., Baltimore, Md.
Simonson, William,
9th & Race sts., Cincinnati, O.
Simpson, William,
101 Fayetteville st., Raleigh, N. C.
Simpson, William C.,
Vienna, Ill.
Simson, Francis C.,
Pentagon Bdg., Halifax, N. S.
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Skinner, William H.,
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Slade, Harry A.,
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22 W. Washington st., Indianapolis, Ind.
Smink, Robert W.,
309 W. Spruce st., Shamokin, Pa.
Smink, William H. R.,
33 Market st., Shamokin, Pa.
Smith, B. Frank,
Walnut & 3d sts., Harrisburg, Pa.
Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
861 Broad st., Newark, N. J.
Smith, Edward N.,
93 Main st., Thompsonville, Conn.
Smith, Edward S.,
Main st., Port Henry, N. Y.
Smith, Lauriston S.,
King st., St. Augustine, Fla.
Smith, Linville H.,
701 Centre st., Jamaica Plain, Mass.
Smith, Reuben R.,
198 9th ave., New York, N. Y.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Whitefoord G.,
31 Patton ave., Asheville, N. C.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smithson, David E.,
Emmett, Canyon Co., Idaho.
Sniteman, Charles C.,
Neillsville, Clark Co., Wis.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
Snyder, Ambrose C.,
13½ St. Felix st., Brooklyn, N. Y.
Snyder, Robert J.,
2d & Market sts., Louisville, Ky.
Sohrbeck, G. Henry,
3d ave. & 16th st., Moline, Ill.
Sohrbeck, George W.,
1601 3d ave., Moline, Ill.
Solomons, Isaiah A.,
163 Congress st., Savannah, Ga.
Sombart, John E.,
Louisiana, Mo.
Sords, Thomas V.,
315 Pearl st., Cleveland, O.
Spalding. Warren A.,
89 Church st., New Haven, Conn.
Sparks, James M.,
718 Garrison ave., Fort Smith, Ark.
Sperry, Herman J.,
633 Chapel st., New Haven, Conn.
Sprague, Wesson G.,
Main st., Flushing, Mich.
Sprowl, George M.,
Union City, Ind.
Squibb, Edward H.,
36 Doughty st., Brooklyn, N. Y.
Squibb, Edward R.,
36 Doughty st., Brooklyn, N. Y.
St. Cyr, Nelvil,
Aux Cayes, Hayti, W. I.
St. John, Sydney S.,
Lakota, N. Dak.
Stacey, Benjamin F.,
Thompson Square, Charlestown, Mass.
Staebler, Richard,
848 Broad st., Newark, N. J.
Staehle, Louis L.,
169 S. Orange ave., Newark, N. J.
Stahlhuth, Ernst H. W.,
5th & Washington sts., Columbus, Ind.
Stamford, William H.,
256 Mulberry st., Newark, N. J.

Stamm, Dante M.,
Geneseo, Ill.
Stange, Carl F.,
721 14th st., San Francisco, Cal.
Starz, Emil A.,
205 Rodney st., Helena, Mont.
Staudt, Louis C.,
51 S. Broad st., Aurora, Ill.
Stearns, Frederick,
371 Lafayette ave., Detroit, Mich.
Stearns, Henry A.,
Care of Fred. Stearns & Co., Detroit, Mich.
Stecher, Henry W.,
1066 Pearl st., Cleveland, O.
Stedem, Frederick W. E.,
Broad st. & Fairmount ave., Philadelphia, Pa.
Steele, George R.,
Main & Prospect sts., Thompsonville, Conn.
Steele, James G.,
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Steiner, Samuel G.,
The Duncan, Nashville, Tenn.
Steinhauer, Frederick,
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Stevens, Alonzo B.,
915 Oakland ave., Ann Arbor, Mich.
Stewart, Francis E.,
13 University Place, New York, N. Y.
Stoehr, Julius J.,
King st., Garrett, Ind.
Stoughton, Dwight G.,
204 State st., Hartford, Conn.
Stowell, Daniel,
1045 Washington st., Boston, Mass.
Streett, Edmund O.,
1401 N. Charles st., Baltimore, Md.
Stuart, Wm. A.,
800 W. Baltimore st., Baltimore, Md.
Stuver, Emanuel,
Rawlins, Wyo.
Sullivan, John W.,
Valley City, N. Dak.
Sweeney, Robert O.,
Duluth, St. Louis Co., Minn.
Sweet, Caldwell,
22 W. Market Square, Bangor, Me.
Symonds, Arthur H.,
Conneaut, Ashtabula Co., O.
Takamine, Jokichi,
90 Maiden Lane, New York, N. Y.
Taylor, George E.,
615 Harrison ave., Leadville, Colo.
Taylor, Mallory H.,
2d & Cherry sts., Macon, Ga.
Taylor, Walter T.,
c. o. I. L. Lyons Co., New Orleans, La.
Temple, Oscar F.,
U. S. A., Fort Riley, Kan.
Terrill, Willis E.,
9 State st., Montpelier, Vt.
Thames, Joseph J.,
E. Main st., Taylor, Williamson Co., Tex.
Thieman, John H., Jr.,
1600 W. Broadway, Louisville, Ky.
Thomas, John B.,
Baltimore & Light sts., Baltimore, Md.
Thomas, Oscar E.,
164 Main st., Columbia, S. C.
Thomas, Robert, Jr.,
126 Broadway, Thomasville, Ga.
Thomason, Richard J.,
100 Union ave., New Rochelle, N. Y.
Thomasson, Anders,
277 Central st., Lowell, Mass.
Thompson, Albert D.,
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Thompson, Albert E.,
Baltimore & Light sts., Baltimore, Md.
Thompson, John,
Residence unknown.
Thompson, William B.,
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Thorn, Henry P.,
Main st., Medford, N. J.
Thurston, Azor,
Grand Rapids, Wood Co., O.
Tigner, James O.,
Greenville, Meriwether Co., Ga.
Tilden, Amos K.,
31 School st., Boston, Mass.
Tobin, John M.,
Narragansett Pier, R. I.
Todd, Albert M.,
204 N. Rose st., Kalamazoo, Mich.
Topley, James,
166 Georgia st., Vallejo, Solano Co., Cal.
Topping, Chas. O.,
19 Vine st., Brooklyn, N. Y.
Torbert, Willard H.,
756 Main st., Dubuque, Ia.
Tracy, David W.,
139 Main st., Hartford, Conn.

Treat, Joseph A.,
Stuart, Guthrie Co., Ia.
Trefethen, Frederick J.,
Naval Dispensary, Kittery, Me.
Treherne, John C.,
189 Hernando st., Memphis, Tenn.
Tremble, John E.,
2480 St. Catharine st., Montreal, Can.
Trevitt, Cleophas A.,
331 Broad st., Rome, Ga.
Troxler, Constantine, Jr.,
228 W. Breckenridge st., Louisville, Ky.
Truax, Charles,
81 Randolph st., Chicago, Ill.
Tsheppe, Adolph,
64th st. & Park ave., New York, N. Y.
Tucker, Greenleaf R.,
City Hospital, Boston, Mass.
Turner, George H.,
296 S. Pearl st., Albany, N. Y.
Turrell, Judson W.,
Longmont, Colo.
Tuthill, Frederic P.,
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Uhlich, Ferdinand G.,
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Ulm, Albert G.,
Cavalier, N. Dak.
Urban, Jacob P.,
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Van Antwerp, Andrew,
Dauphin & Royal sts., Mobile, Ala.
Van Antwerp, Garet,
71 Dauphin st., Mobile, Ala.
Van Winkle, Abraham W.,
35 Clinton ave., Newark, N. J.
Vargas-Heredia, Jorge,
71 Falmouth st., Boston, Mass.
Varney, Edward F.,
39 Tremont st., Boston, Mass.
Vaughan, Parry W.,
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Vellines, Davies,
700 N. Fulton ave., Baltimore, Md.
Vernor, James,
33 Woodward ave., Detroit, Mich.
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79 Newark ave., Jersey City, N. J.
Voigt, Joseph F.,
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Vonachen, Frank H.,
622 N. Adams st., Peoria, Ill.
Vordick, August H.,
Jefferson ave. & Benton st., St. Louis, Mo.
Voss, George W.,
680 Woodland ave., Cleveland, O.
Votteler, William,
Shelby & Oak sts., Louisville, Ky.
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Waggener, Richard.
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Walker, William J.,
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Warren, Edwin A.,
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Washburn, Harry M.,
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Watson, Herbert K.,
803 Market st., Wilmington, Del.
Watson, Sidney P.,
137 Richardson st., Atlanta, Ga.
Watt, George H.,
Pullman, Wash.
Watters, Henry,
Sparks & Bank sts., Ottawa, Can.
WAUGH, GEORGE J.,
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Trade & Tryon sts., Charlotte, N. C.
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Webster, H. Gordon,
15 Washington ave. W., Minneapolis, Minn.
Weeks, B. Frank,
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Weida, Charles A.,
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Weidemann, Charles A.,
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WELLCOME, HENRY S.,
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Wells, Edwin H.,
43 Hanover st., Boston, Mass.
Wendell, Henry E.,
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Wenzell, William T.,
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West, Charles A.,
99 Broad st., Boston, Mass.
Westcott, James W.,
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Westmann, Frank H.,
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Wetterstroem, Albert,
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Wetterstroem, Theodore D.,
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White, George H.,
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White, Herbert E.,
Jamestown, N. Dak.
White, Richard E.,
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WHITFIELD, THOMAS,
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Whitman, Nelson S.,
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Whitney, Edgar F.,
Warren, Minn.
WHITNEY, HENRY M.,
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Wichelns, Frederick,
192 Greenwich st., New York, N. Y.
Wickham, William H.,
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Williams, Seward W.,
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Williams, William H.,
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Williamson, Lee,
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Willis, Henry,
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Winkelmann, John H.,
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Woodward, Brinton W.,
Lawrence, Kan.
Wooldridge, Daniel T..
9 Morgan st., Boonville, Mo.
Wooten, Thomas V.,
943 W. Madison st., Chicago, Ill.
Wuensch, Charles,
494 Springfield ave., Newark, N. J.
Wulling, Frederick J.,
Minn. University, Minneapolis, Minn.
Wunderlich, Edward,
1415 Dryades st., New Orleans, La.
Wurmb, Theodore H.,
1923 E. Grand ave., St. Louis, Mo.
Yearby, William M.,
123 E. Main st., Durham, N. C.
Yorston, Matthew M.,
1063 Central ave., Cincinnati, O.
Youngs, William,
Room 6, Thornton Bl'd, Rich Hill, Mo.
Zellhoefer, George,
1044 Broadway, Brooklyn, N. Y.
Ziegler, Philip M.,
526 Penn st., Reading, Pa.
Zimmermann, Albert,
2113 S. Adams st., Peoria, Ill.
Zimmermann, Bernard,
45 E. 4th st., St. Paul, Minn.
Zimmermann, Charles,
105 2d ave., Peoria, Ill.
Zoeller, Edward V.,
Main st., Tarboro, N. C.
Zuenkeler, J. Ferd.,
1902 Vine st., Cincinnati, O.
Zwick, Karl G.,
1102 Madison ave., Covington, Ky.

LIST OF MEMBERS WHO HAVE RESIGNED SINCE PUBLICATION OF LAST REPORT.

	Elected.		Elected.
Bechberger, Henry	1893	Nickey, Frank B	1895
Bloomstein, Max	1896	Parks, William N	1897
Breck, Frederick W	1897	Porter, Henry C	1880
Carver, Frank H	1891	Priest, Carlton R	1896
Cutts, Foxwell C., Jr	1875	Purcell, Nicholas S	1890
Dodd, Simon W	1884	Reynolds, Wm. K	1876
Feemster, Joseph H	1873	Roberts, William	1897
Flint, George B	1889	Schetky, Lawrence O	1898
Grossman, Edward L	1893	Schueller, Ernst	1881
Hargrave, Edward T	1897	Siegemund, Charles A	1882
Hoffman, Julius	1887	Shryer, Thomas W	1875
Kieffer, George	1890	Spaulding, Geo. S	1897
Lehn, Louis	1874	Vilter, Hermann T	1881
Miner, Mrs. Mary O	1892	Ward, George J	1893
Mueller, Otto E	1888		

LIST OF MEMBERS WHO HAVE DIED SINCE PUBLICATION OF LAST REPORT.

Aird, William,	E. Jacksonville, Fla.,	Elected	1887
Bayley, Augustus R.,	Cambridgeport, Mass.,	"	1859
Calder, Albert L.,	Providence, R. I.,	"	1859
Christiani, Charles,	Washington, D. C.,	"	1874
Dejan, J. B. George,	New Orleans, La.,	"	1891
Gille, Norbert (Honorary),	Brussels, Belgium,	"	1868
Grahame, Israel J.,	Philadelphia, Pa.,	"	1856
Greenish, Thomas (Honorary),	London, England,	"	1882
Greve, Theodore L. A.,	Cincinnati, O.,	"	1864
Hartwig, Chas. F.,	Chicago, Ill.,	"	1881
Heinitsh, Charles A.,	Lancaster, Pa.,	"	1857
Kochan, John,	Denver, Colo.,	"	1888
Leonhard, Rudolph E.,	Paterson, N. J.,	"	1891
Marshall, Rush P.,	Monrovia, Cal.,	"	1893
Miller, Jason A.,	Gloversville, N. Y.,	"	1879
Newman, George A.,	Brooklyn, N. Y.,	"	1865
Osgood, Hugh H.,	Norwich, Conn.,	"	1875
Plummer, D. G.	Bradford, Ill.,	"	1869
Russell, Eugene J.,	Baltimore, Md.,	"	1856
Sennewald, Ferdinand W.,	St. Louis, Mo.,	"	1865
Stahler, William,	Norristown, Pa.,	"	1880
Tufts, Charles A.,	Dover, N. H.,	"	1856
Waldheim, A. S. Von (Honorary),	Vienna, Austria,	"	1871
Zwick, George A.,	Covington, Ky.,	"	1874

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-PAYMENT OF DUES, ACCORDING TO ARTICLE III., CHAPTER VII., OF THE BY-LAWS.

(PUBLISHED IN ACCORDANCE WITH A GENERAL RULE ADOPTED AT MONTREAL, CANADA, AUGUST, 1896. SEE PAGE 17, VOLUME 44, PROCEEDINGS.)

Acker, Philip,	Cleveland, O.,	Elected 1889
Airheart, Israel B.,	Lonoke, Ark.,	" 1896
Ault, Edward A.,	Marysville, Kan.,	" 1895
Benhard, Albert H.,	So. Hadley Falls, Mass.,	" 1894
Betz, Otto E.,	Cincinnati, O.,	" 1887
Black, John R.,	Cripple Creek, Colo.,	" 1891
Blackman, Wm. M.,	Nashville, Tenn.,	" 1896
Bodemann, Wilhelm,	Chicago, Ill.,	" 1887
Burrill, John W.,	Auburn, Me.,	" 1896
Calvert, John,	San Francisco, Cal.	" 1870
Carton, John A.,	Britt, Ia.,	" 1895
Chalin, Louis F.,	New Orleans, La.,	" 1887
Childs, Wm. R.,	North Wales, Pa.,	" 1896
Cogan, Denis S.,	Portland, Me.,	" 1896
Cole, Allen M.,	Virginia City, Nev.,	" 1895
Cuthbert, Richard W.,	Philadelphia, Pa.,	" 1893
Day, George A.,	Fargo, N. D.,	" 1896
DeArmona, Joseph R.,	Key West, Fla.,	" 1893
Demond, Otto J.,	St. Joseph, Mo.,	" 1892
Dixson, Frederick H.,	Warren, Pa.,	" 1892
Donaldson, Joseph C.,	Minneapolis, Minn.,	" 1893
Dorner, Emil A.,	Chicago, Ill.,	" 1892
Dowdy, Joseph F., Jr.,	Little Rock, Ark.,	" 1894
Driggs, Charles M.,	White Haven, Pa.,	" 1881
Ewing, Frederic C.,	Glenwood Springs, Colo.,	" 1889
Faber, Frederick W.,	St. Paul, Minn.,	" 1895
Foster, Wm. O.,	St. Thomas, Ontario, Can.,	" 1881
Gausewitz, William,	Owatonna, Minn.,	" 1895
Gayner, John N.,	Grove City, Mo.,	" 1890
Gerhard, Samuel,	Philadelphia, Pa.,	" 1873
Gorman, John T. B.,	Boston, Mass.,	" 1892
Hardy, Cyrus D.,	Providence, R. I.,	" 1891
Harrah, John W.,	Minneapolis, Minn.,	" 1895
Harrison, Jacob H.,	Davenport, Ia.,	" 1883
Heyerdahl, Carl O.,	Lake Park, Minn.,	" 1893
Hodgkinson, Samuel J.,	Reno, Nev.,	" 1895
Holverson, Henry T.,	Alexandria, Minn.,	" 1895
James, Wm. T.,	Flushing, N. Y.,	" 1882
Kenney, Herbert E.,	Littleton, N. H.,	" 1896
Kerr, Frank G.,	Van Buren, Ark.,	" 1890
King, Robert B.,	Helena, Ark.,	" 1896
Kline, Charles G.,	Harriman, Tenn.,	" 1894
Klotz, August E.,	Chicago, Ill.,	" 1895
Lahme, Chas. A.,	Kansas City, Mo.,	" 1881

Lander, John C.,	Toronto, Can.,	Elected 1877
Lecours, Joseph E. W.,	Montreal, Can.,	" 1896
Leine, Arthur M.,	Honesdale, Pa.,	" 1895
Leonardi, Sydney B.,	Tampa, Fla.,	" 1890
Lewi, Theodore J.,	Albany, N. Y.,	" 1896
Linton, Charles E.,	Woods, Ore.,	" 1896
Macmillan, Alex. M.,	Montreal, Can.,	" 1896
Maguire, Andrew,	Chicago, Ill.,	" 1896
Mason, Geo. L.,	Walla Walla, Wash.,	" 1895
McCrea, Harry F.,	Denver, Colo.,	" 1895
Meininger, Albert,	Cincinnati, Ohio,	" 1881
Meyer, Alfred,	New Orleans, La.,	" 1896
Miles, Henry,	Montreal, Can.,	" 1896
Miner, Orrin E.,	Noank, Conn.,	" 1894
Moody, Richard H.,	Belfast, Me.,	" 1876
Offutt, Willard C.,	Savannah, Ga.,	" 1896
Parks, John K.,	Woodfords, Me.,	" 1896
Pfunder, William,	Portland, Ore.,	" 1889
Pinniger, William,	Reno, Nev.,	" 1895
Porter, Louis F.,	Cambridgeport, Mass.,	" 1892
Ray, Frederick E.,	Sacramento, Cal.,	" 1889
Renz, Frederick J.,	Louisville, Ky.,	" 1883
Richard, Alexander,	Stillwater, Minn.,	" 1896
Richardson, Frank,	Albany, N. Y.,	" 1896
Roy, J. Emile,	Quebec, Can.,	" 1896
Sanderson, Stephen F.,	Minneapolis, Minn.,	" 1880
Scott, J. McDonald,	Chicago, Ill.,	" 1892
Shumpik, Edward,	Minneapolis, Minn.,	" 1895
Simson, Wm. A.,	Halifax, N. S.,	" 1894
Smith, James P.,	Augusta, Ga.,	" 1894
Smith, Samuel W.,	Ansonia, Ct.,	" 1889
Smith, Thomas E.,	Mobile, Ala.,	" 1894
Stewart, Andrew M.,	Tacoma, Wash.,	" 1896
Stiles, Justin E.,	Wells, Minn.,	" 1895
Thomas, James,	Nashville, Tenn.,	" 1896
Townsend, James V.,	Atlantic City, N. J.,	" 1896
Webb, David C.,	Forrest City, Ark.,	" 1896
Weiser, William A.,	Bourbon, Ind.,	" 1894
Wilder, George P.,	Lebanon, N. H.,	" 1892
Wingate, Frank H.,	Sanford, Me.,	" 1896
Young, Hiram W.,	St. Louis, Mo.,	" 1894

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